INSTALLATION RESTORATION PROGRAM

(1)

PRELIMINARY ASSESSMENT

McGhee - Tyson ANGB

McGhee - Tyson Municipal Airport

Knoxville, Tennessee

JUNE 1988

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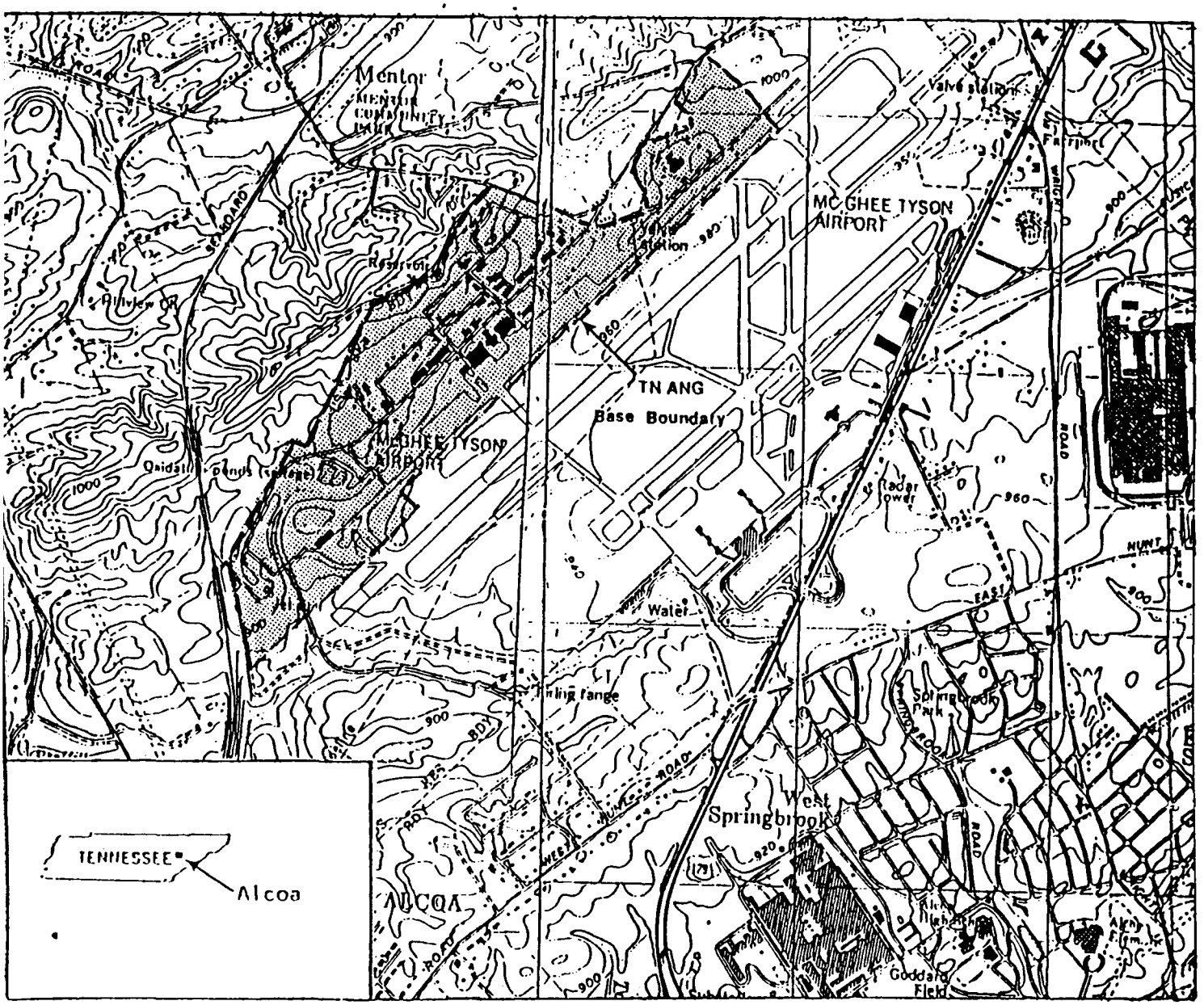

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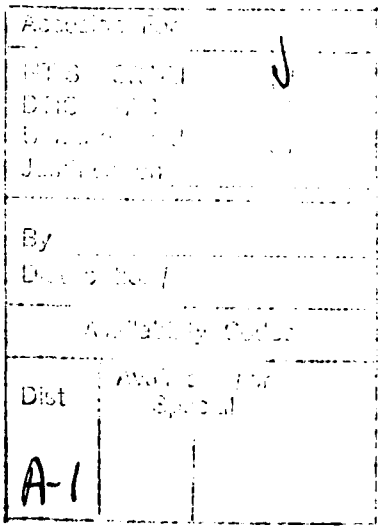

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ACRONYM LIST

ADC	Air Defense Command
AFOEHL	Air Force Occupational and Environmental Health Laboratory
ANG	Air National Guard
ANGB	Air National Guard Base
ANGSC	Air National Guard Support Center
ARG	Air Refueling Group
CERCLA	Comprehensive Environmental Response Compensation and Liability Act of 1980 also called "Superfund"
DD	Decision Document
DoD	U. S. Department of Defense
DoE	Department of Energy
DRMO	Defense Reutilization and Marketing Service
EPA	U. S. Environmental Protection Agency
FTA	Fire Training Area
HARM	U. S. Air Force Hazard Assessment Rating Methology
HAS	Hazard Assessment Score
HRS	Hazard Ranking System
IRP	Installation Restoration Program
NATO	North Atlantic Treaty Organization
NGB	National Guard Base
PA	Preliminary Assessment
PMEC	Professional Military Education Center
POL	Petroleum, Oil and Lubricant
POTW	Publicly Owned Treatment Works
RCRA	Resource Conservation Recovery Act
SAC	Strategic Air Command
SARA	Superfund Amendments and Reauthorization Act of 1986
SCS	Soil Conservation Service
TAC	Tactical Air Command
TN ANG	Tennessee Air National Guard
TVA	Tennessee Valley Authority
USAF	United States Air Force
USAFE	United States Air Force, Europe
USDA	United States Department of Agriculture
USGS	United States Geological Soil Survey
UST	Underground Storage Tank

EXECUTIVE SUMMARY

A. Introduction

Science & Technology, Inc. (SciTek) was retained to conduct the Installation Restoration Program (IRP) Preliminary Assessment of the 134th Air Refueling Group, Tennessee Air National Guard (TN ANG) McGhee-Tyson Air National Guard Base (ANGB), Knoxville, Tennessee.

The Preliminary Assessment (PA) included:

- An on-site visit including interviews with 30 Base personnel (former and active) and field surveys by SciTek representatives during 11-15 April, 1988;
- acquisition and analysis of information on past hazardous materials use, and waste generation and disposal at the Base;
- acquisition and analysis of available geologic, hydrologic, meteorologic, and other environmental data from federal, state, and local agencies; and
- the identification and assessment of sites on the Base which may have been contaminated with hazardous materials/hazardous waste.

B. MAJOR FINDINGS

The Air National Guard has utilized hazardous materials and generated small amounts of wastes in mission oriented operations and maintenance at McGhee-Tyson ANGB since 1958.

Operations that have used and disposed of hazardous materials include: aircraft maintenance, aerospace ground equipment (AGE) maintenance, vehicle maintenance, and petroleum-oil-lubricant (POL) management and distribution. Varying quantities of waste POL products, paints, thinners, strippers, and solvents have been generated and disposed of by these activities.

Interviews with 30 Base personnel and the field surveys resulted in the identification of eleven (11) sites (see Figure ES.1). Of this total, seven exhibit the potential for contaminant presence and possible migration. The remaining four sites pose no potential threat to human and environmental receptors from either surface or ground water contamination.

Source: McGhee-Tyson ANGB
Civil Engineering

Proposed Sites McGhee-Tyson ANGB

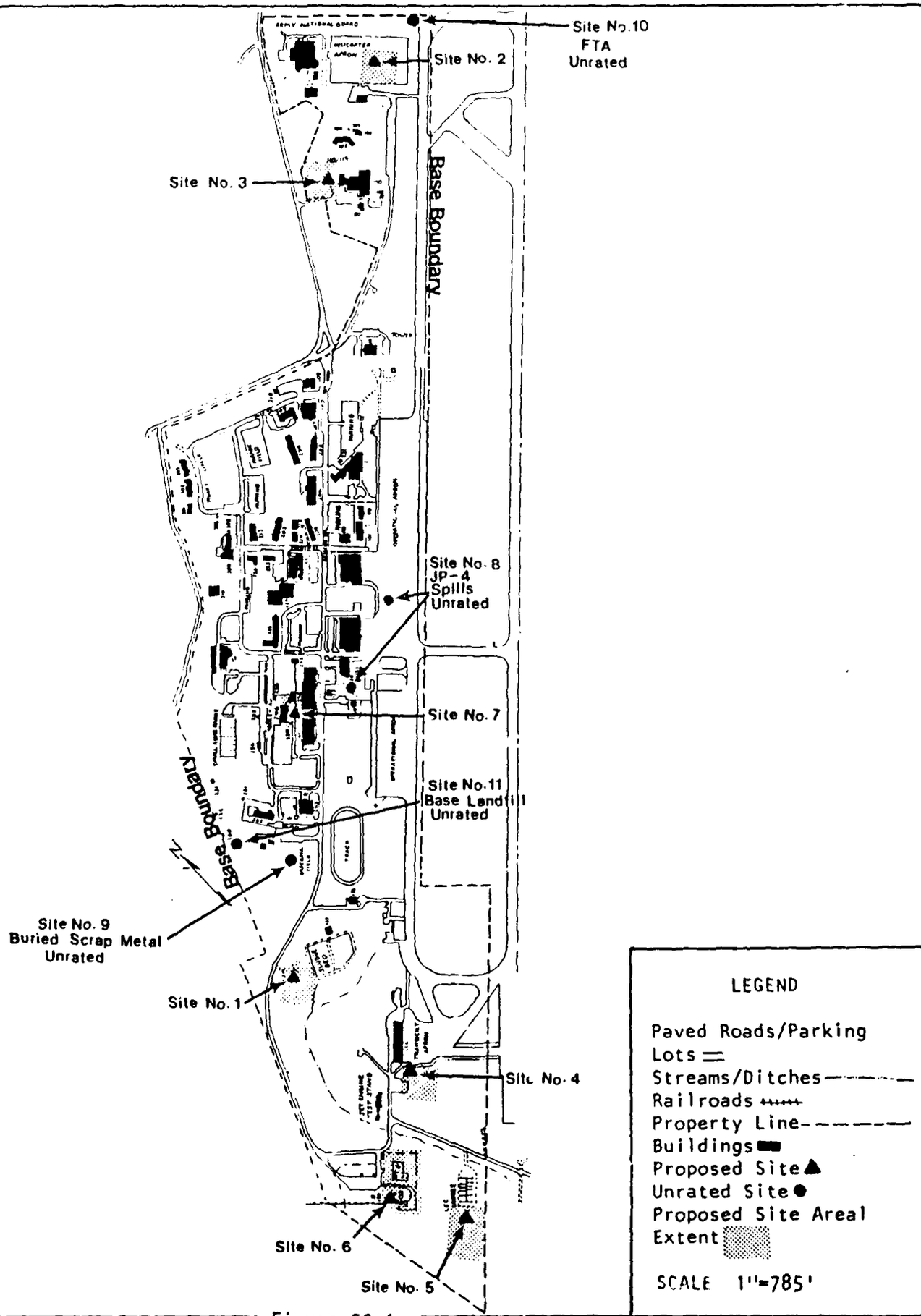


Figure ES.1.

The following sites are potentially contaminated and require further investigation.

Each of the potentially contaminated sites has been rated and assigned a Hazard Assessment Score (HAS) utilizing the Air Force Hazard Assessment Rating Methodology (HARM).

A short discussion of the rationales for including each site along with its HAS follows:

Site No. 1 - Fire Training Area (FTA) at the Sewage Treatment Bed (HAS - 67)

Prior to 1985, fire training was conducted extensively at this site using Base generated liquid waste and/or JP-4 as fuel.

Site No. 2 - Fire Training Area (FTA) at the Army National Guard Helicopter Parking Apron (HAS - 69)

Prior to 1978, fire training was conducted extensively at this site. The fuel used was liquid waste from the Base and/or JP-4 fuel.

Site No. 3 - Oil/Water Separator at 110/119th TCF Vehicle Maintenance Area, Building 100 (HAS - 56)

Stress vegetation was observed downgradient from the overflow line of the oil/water (o/w) separator. In addition, interviewees reported a waste oil discharge of at least 200 gallons while the o/w separator effluent line was broken when a communication cable was being installed.

Site No. 4 - Oil/Water Separators at AGE Shop, Building 126 (HAS - 56)

Oil stained soil and stress vegetation was observed in a drainage swale directly adjacent to the twin oil/water (o/w) separators. In addition, surface contamination was observed about 200 feet downgradient from the separators.

Site No. 5 - Base Landfill Adjacent to Main Storage Facility (HAS - 44)

A past Base landfill of approximately 2 acres in areal extent was closed out and covered with clay soil. It was used from 1956 to 1968. Non-liquid waste items including general garbage, empty paint cans, and other non-toxic items were reported to be disposed there. Numerous Base interviewees stated that no toxic chemicals were disposed of in the landfill.

Site No. 6 - Main POL Facility (HAS - 73)

Three major past JP-4 spills have been reported to have occurred within the main POL area. The volumes of JP-4 released into the environment were approximately 5,000 gallons, 2,000 gallons and in excess of 30,000 gallons.

Site No. 7 - Oil/Water Separator at Vehicle Maintenance, Building 246 (HAS-56)

There are confirmed reports of past liquid waste release into the storm sewer drainage from the Building 246 o/w separator.

The following sites do not pose a potential threat to health or environment, do not justify applying the USAF HARM, and are not considered to be candidates for further IRP investigations:

Site No. 8 - JP-4 Spills at Aircraft Parking Apron and Intermediate POL.

Site No. 9 - Buried Scrap Metal at the McGhee-Tyson ANGB Baseball Field.

Site No. 10 - Fire Training Area (FTA) Adjacent to Taxiway.

Site No. 11 - Base Landfill Adjacent to Building 260 Incinerator.

A detailed description of these sites is included in Section IV of this PA report, along with the rationale for the "No Further Action" decision.

C. CONCLUSIONS/RECOMMENDATIONS

It has been concluded that there exists a potential for contaminant migration at seven of the 11 identified sites. Initiation of further IRP investigations are recommended for these seven sites. The primary objectives of subsequent investigations are:

1. To determine the presence or absence of contaminants; and, if present

2. To identify and quantify contaminants, determine their extent and rate of migration, their impact on soils, surface water, groundwater, and potential human and/or environmental receptors.

It has been concluded that the four remaining (unrated) sites do not pose a potential threat to either human health or the environment. No further IRP investigations are recommended for these four sites. Decision Documents, supporting the "No Further Action" alternative, will be prepared under separate cover.

I. INTRODUCTION

A. Background

The 134th Air Refueling Group (ARG) is located at the McGhee-Tyson Air National Guard Base (ANGB), McGhee-Tyson Municipal Airport (MAP), Knoxville, TN [hereinafter referred to as the Base]. The Base has been active at McGhee Tyson Airport since 1958, and, over the years a variety of military aircraft have been located and serviced there. Both the past and current operations required the use of hazardous materials. The disposal of these hazardous materials should be evaluated for potential contamination.

The Department of Defense (DoD) Installation Restoration Program (IRP) is a comprehensive program designed to:

- Identify and fully evaluate suspected problems associated with past hazardous waste disposal and/or spill sites on DoD installations, and
- Control hazards to human health, welfare, and the environment that may have resulted from these past practices.

During June 1980, DoD issued a Defense Environmental Quality Program Policy Memorandum (DEQPPM-80-6) requiring identification of past hazardous waste disposal sites on DoD installations. The policy was issued in response to the Resource Conservation and Recovery Act of 1976 (RCRA) and in anticipation of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA, Public law 96-510) commonly known as "Superfund". In August of 1981, the President delegated certain authority specified under CERCLA to the Secretary of Defense via executive order (EO 12316). As a result of EO 12316, DoD revised the IRP by issuing DEQPPM 81-5, on December 1981, which reissued and amplified all previous directives and memoranda.

Although the DoD IRP and the USEPA Superfund programs were essentially the same, differences in the definition of program phases and lines of authority resulted in some confusion between DoD and state/federal regulatory agencies. These difficulties were rectified via passage of the Superfund Amendments and Reauthorization Act (SARA, PL-99-499) of 1986. On 23 January 1987 Presidential Executive Order EO 12580 was issued. EO 12580 effectively revoked EO 12316 and implemented the changes promulgated by SARA.

The most important changes affected by SARA included the following:

- Section 120 of SARA provides that federal facilities, including those in DoD, are subject to all provisions of CERCLA/SARA concerning site assessment, evaluation under the National Contingency Plan (NCP) [40CFR300], listing on the National Priorities List (NPL), and removal/remedial actions. DoD must therefore comply with all the procedural and substantive requirements (guidelines, rules, regulations, and criteria) promulgated by the USEPA under Superfund authority.

- Section 211 of SARA also provides continuing statutory authority for DoD to conduct its Installation Restoration program (IRP) as part of the Defense Environmental Restoration Program (DERP). This was accomplished by adding chapter 160, sections 2701-2707 to Title 10 United States Code (10 USC 160).

- SARA also stipulated that terminology used to describe or otherwise identify actions carried out under the IRP shall be substantially the same as the terminology of the regulations and guidelines issued by the USEPA under their Superfund authority.

- As a result of SARA, the operational activities of the IRP are currently defined and described as follows:

  Preliminary Assessment (PA)

  A records search designed to identify and evaluate past disposal and/or spill sites which might pose a potential and/or actual hazard to public health, welfare, or the environment.

  Site Investigation/ Remedial Investigation/ Feasibility Study (SI/RI/FS)

  The Site Investigation consists of field activities designed to confirm the presence or absence of contamination at the potential sites identified in the PA. The Remedial Investigation consists of field activities designed to quantify and identify the potential contaminant, the extent of the contaminant plume, and the pathways of contaminant migration.

If applicable, a public health evaluation is performed to analyze the collected data. Field tests are required which may necessitate the installation of monitoring wells or the collection and analysis of water, soil and/or sediment samples. Careful documentation and quality control procedures, in accordance with CERCLA/SARA guidelines, ensure the validity of data. Hydrogeologic studies are conducted to determine the underlying strata, groundwater flow rates, and direction of contaminant migration. The findings from these studies result in the selection of one or more of the following options:

- **No Further Action** - Investigations do not indicate harmful levels of contamination and do not pose a significant threat to human health or the environment. The site does not warrant further IRP action and a Decision Document (DD) will be prepared to close out the site.

- **Long-Term Monitoring** - Evaluations do not detect sufficient contamination to justify costly remedial actions. Long-Term monitoring may be recommended to detect the possibility of future problems.

- **Feasibility Study** - Investigation confirms the presence of contamination that may pose a threat to human health and/or the environment, and some sort of remedial action is indicated. The Feasibility Study is therefore designed and developed to identify and select the most appropriate remedial action. The FS may include individual sites, groups of sites, or all sites on an installation. Remedial alternatives are chosen according to engineering and cost feasibility, state/federal regulatory requirements, public health effects, and environmental impacts. The end result of the FS is the selection of the most appropriate remedial action by the ANG with concurrence by state and/or federal regulatory agencies.

Remedial Design/Remedial Action (RD/RA) - The RD involves formulation and approval of the engineering designs required to implement the selected remedial action. The RA is the actual implementation of the remedial alternative. It refers to the accomplishment of measures to eliminate the hazard; or, at a minimum, reduce it to an acceptable limit. Covering a landfill with an impermeable cap, pumping and treating contaminated groundwater, installing a new water

distribution system, and in situ biodegradation of contaminated soils are examples of remedial measures that might be selected. In some cases, after the remedial actions have been completed, a long-term monitoring system may be installed as a precautionary measure to detect any contaminant migration or to document the efficiency of remediation.

Intermediate Action Alternatives - At any point, it may be determined that a former waste disposal site poses an immediate threat to public health or the environment, thus necessitating prompt removal of the contaminant. Immediate action, such as limiting access to the site, capping or removing contaminated soils and/or providing an alternate water supply may suffice as effective control measures. Sites requiring immediate removal action maintain IRP status in order to determine the need for additional remedial planning or long-term monitoring. Removal measures or other appropriate remedial actions may be implemented during any phase of an IRP project.

B. PURPOSE

The purpose of this IRP Preliminary Assessment (PA) Records Search is to identify and evaluate suspected problems associated with past waste handling procedures, disposal sites, and spill sites on the Base property.

The potential for migration of hazardous contaminants was evaluated by visiting the Base, reviewing existing environmental data, analyzing Base records concerning the use and generation of hazardous materials, and conducting interviews with present and past Base personnel who had knowledge of past waste disposal techniques and handling methods. Pertinent information collected and analyzed as part of the PA included a records search of the history of the Base; the local geological, hydrogeological, and meteorological conditions that might influence migration of contaminants; and ecological settings that indicate environmentally sensitive conditions.

C. SCOPE

The scope of this Preliminary Assessment was limited to the identification of sites at, or under primary control of the Base and evaluation of potential receptors. The PA included:

- o an on-site visit during 11-15 April, 1988;
- o acquisition of records and information on hazardous materials use and waste handling practices;
- o acquisition of available geologic, hydrologic, meteorologic, land use and zoning, critical habitat, and related data from federal and Tennessee state agencies;
- o a review and analysis of all information obtained; and,
- o preparation of a summary report to include recommendations for further action.

The subcontractor effort was conducted by the following Science & Technology, Inc. (SciTek) personnel: Mr. James E. Hunt, Sr. Chemical Engineer; Mr. Jack D. Wheat, Hydrogeologist; and Mr. Ray S. Clark, Civil/Environmental Engineer. Resumes of Search Team members are included in Appendix A. Lt. Col. M. C. Washeleski and Mr. Sal Orochena of the Air National Guard Support Center (ANGSC) are project officers for this Base and participated in the overall assessment during the week of the site visit.

The points of contact at the Base were SMSgt. David D. Hill, Facilities Manager; and TSgt. Gaylon Burkhart, Bioenvironmental Engineering Technician.

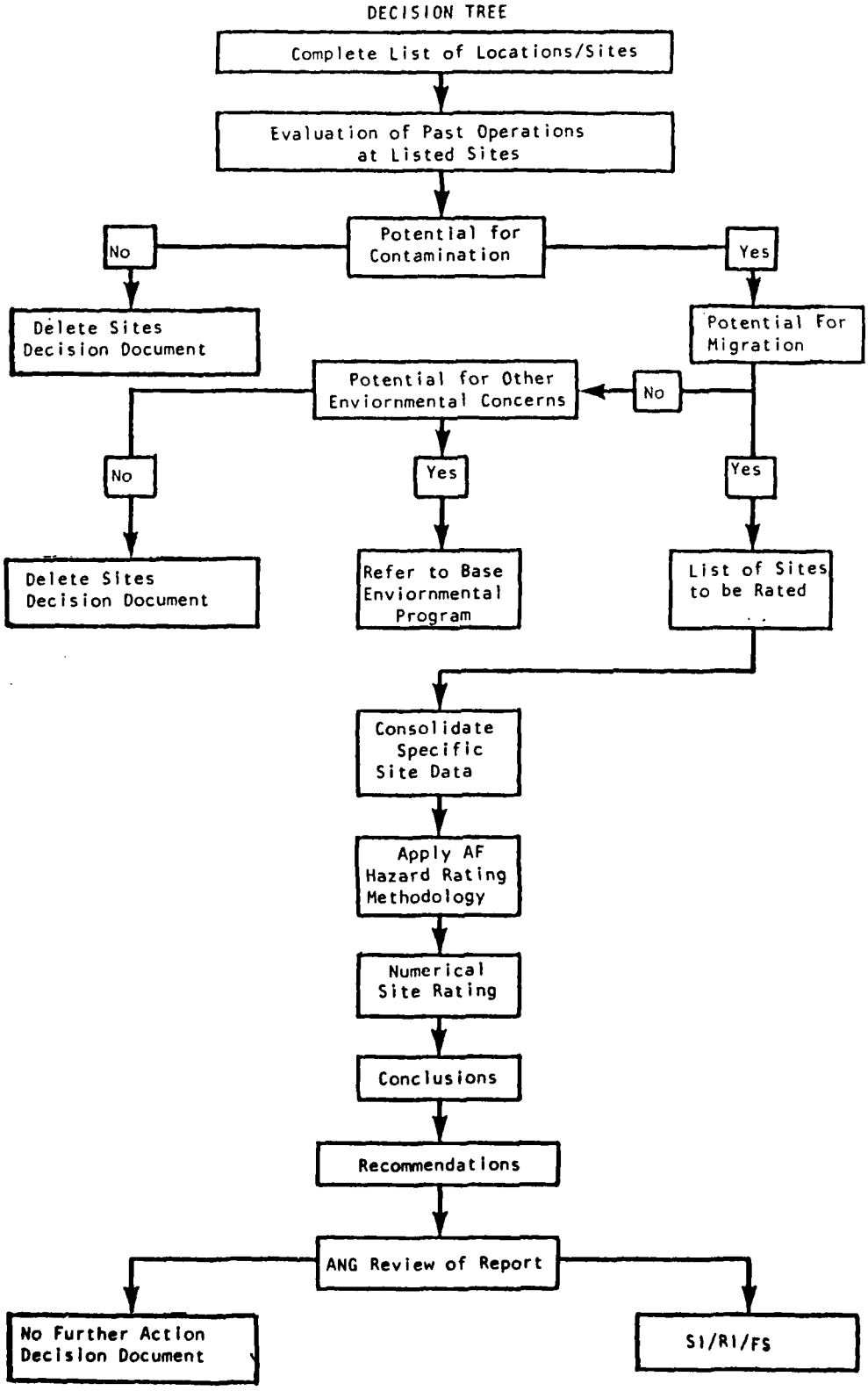
D. METHODOLOGY

Figure I.1 depicts a flow chart of the records search methodology.

The Preliminary Assessment began with a site visit to the McGhee-Tyson ANGB to identify all operations that may have utilized hazardous materials or may have generated hazardous waste. Past and present materials handling procedures were evaluated by extensive interviews with 30 past and present Base employees familiar with the various operating procedures. These interviews were also conducted to determine those areas where waste materials (hazardous or non-hazardous) were used, spilled, stored, disposed of, or released into the environment.

Figure I.1

PRELIMINARY ASSESSMENT METHODOLOGY FLOW CHART



A total of 30 personnel, with experience in all areas of ANGB operations, were interviewed during the PA site visit. Knowledge and experience with Base operations averaged 21.3 years and ranged from five to 32 years. Records contained in the Base files were collected and reviewed to supplement the information obtained from interviews. Eleven potential sites were identified. Of that total, seven were judged to be potentially contaminated and in need of additional investigation. The seven potentially contaminated sites were rated using the Air Force Hazard Assessment Rating Methodology (HARM).

Detailed geological, hydrogeological, meteorological, and environmental data for the area of study was also obtained from the appropriate federal and state agencies. A listing of federal and state agency contacts is included as Appendix B.

After a detailed analysis of all the information obtained, it was decided that seven of the eleven sites are potentially contaminated with hazardous materials/hazardous wastes, and that the potential for contaminant migration exists. Under the IRP program, when sufficient information is available, sites are numerically scored using the Air Force Hazardous Assessment Rating Methodology (HARM). A description of HARM is presented in Appendix C. The seven potentially contaminated sites were scored (Appendix D) and each was recommended for further investigation.

The remaining four sites were judged to pose no threat to either human health or the environment, and no further IRP investigations are required. Decision Documents, in support of this conclusion, are being prepared, under separate cover, for the four (unrated) sites.

II. INSTALLATION DESCRIPTION

A. Location

The McGhee-Tyson ANGB is located within Blount County, Tennessee four miles northwest of Alcoa directly adjacent to McGhee-Tyson Municipal Airport. Major access routes include U. S. 129 (also known as New Knoxville or Alcoa Highway) and Air Base Road. The Base occupies 323 acres, has an approximate population of 1,300, including tenants, and is home to the 134th Air Refueling Group, the 110/119th Tactical Flight Command, and the 228th Air Force Communication Squadron. Figure II.1 illustrates the location and boundaries of the McGhee-Tyson ANGB.

B. Organization and History

The 134th Air Refueling Group is one of the youngest flying units in the Air National Guard Program. This unit obtained federal recognition on 15 December 1957, officially taking over the base on 8 January 1958. The 134th Air Refueling Group consists of four squadrons: 134th Combat Support Sq., 134th Consolidated Aircraft Maintenance Sq., 134th Resources Sq., 151st Air Refueling Squadron, and the 134th USAF Clinic.

On 11 October 1958, ten months after the unit had started, five pilots were placed on an Air Defense Command (ADC) daylight readiness alert: a readiness alert that has been estimated would take as long as two years to achieve.

In January 1960 the first of what would prove to be many conversions to different type aircraft took place when the 134th switched from F-86D to F-86L. This conversion was made smoothly and efficiently with no interruption to the ADC Alert Commitment. Because of its outstanding performance, the 134th was one of two Air Guard units in the nation to receive the top interceptor in the world, the 1400 mph plus F-104A Starfighter. On 1 January 1961, the Air Defense Command upgraded the unit from a 14 hour to a 24 hour around the clock commitment.

Due to the Berlin crisis, the unit was called to active duty in Germany in November 1961. While stationed at Ramstein Airbase, Germany, the squadron was deployed briefly to Libya to train in the use of the Sidewinder heat-seeking missile. The unit was also involved in a NATO exchange program with the French Air Force, and set an all-time record for the highest average flying time per aircraft for jet fighters in any one month. In August 1962, the 134th returned to State Status with the F-104's.

Source: U.S.G.S. 7.5 Minute Series
Louisville 1968 and Maryville 1979
Tennessee

Major Access Routes McGhee-Tyson ANGB

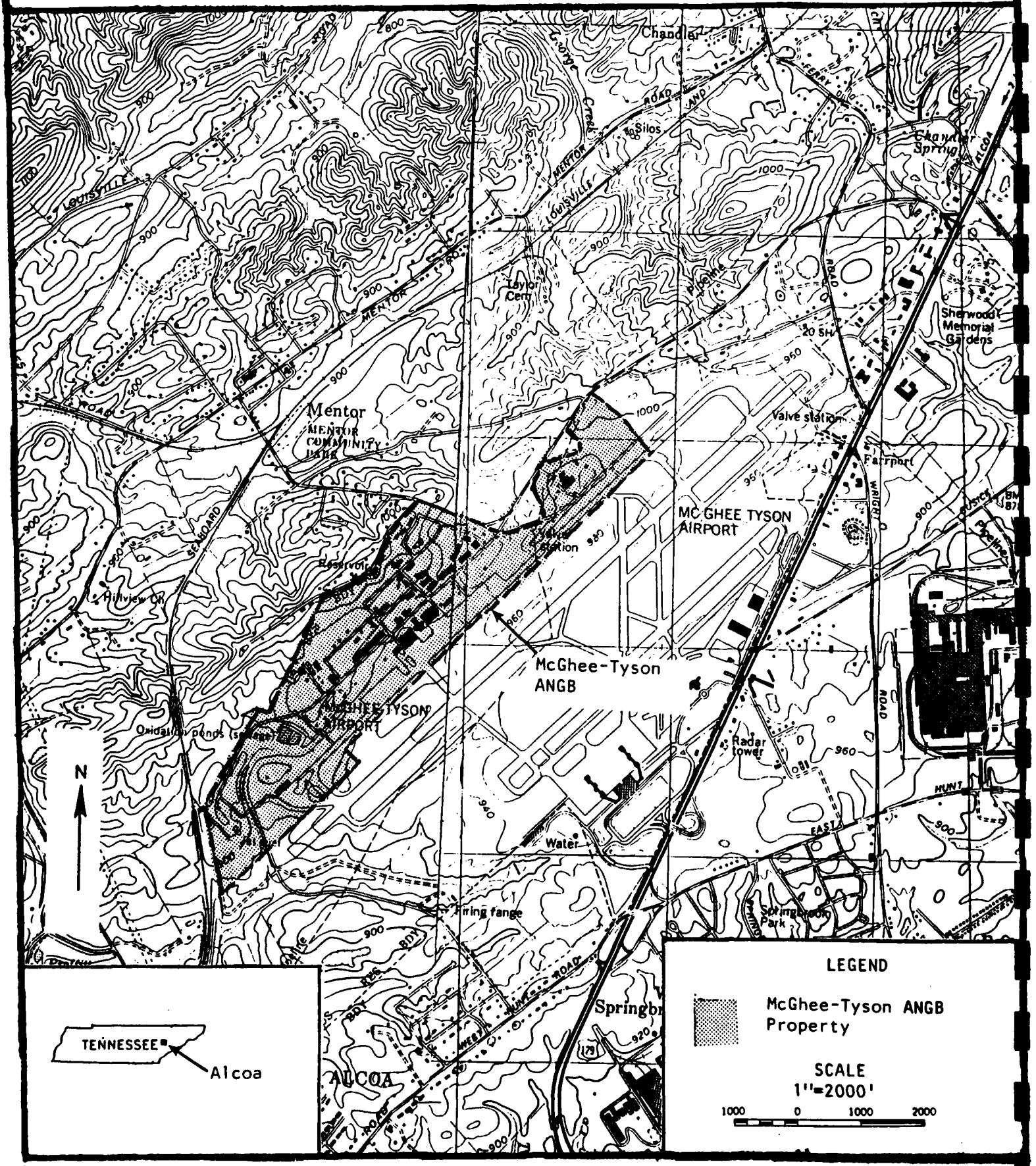


Figure II.1.

The 134th's role in Germany led to the painting "Watch Over the Rhine" featuring a plane and a pilot from the 134th. It was the first painting ever to hang in the Pentagon depicting the activities of the Air National Guard.

Just two months after being released from active duty, the 134th's air refueling squadron (the 151st Starfighters) was needed by the Air Force to contain the threat from Cuba. The Cuban crisis brought still another aircraft conversion by losing the F-104's and converting to the F-102's. In just six months the 134th became combat ready and passed an operational readiness inspection in the F-102 aircraft. No one had ever done it faster.

In April 1964 it was time for yet another aircraft conversion, the fifth in less than seven years. The F-102's were replaced with the Boeing KC-97G Aircraft. Also, the Air Defense Command (ADC) was changed to the Tactical Air Command (TAC). Having no previously qualified KC-97 aircrews or maintenance personnel assigned, this organization became the first KC-97 equipped unit to achieve operational status in just eight months after receipt of the aircraft. The previous "normal" conversion time was two years. In addition to the usual pilot transition, the conversion involved complete training of ground crew personnel, combat ready flight engineers, and boom operators. The KC-97's represented the beginning of the Air Refueling mission for the 134th Air Refueling Group.

After conversion to the KC-97, the unit participated in numerous stateside, South East Asia, South American and European deployments. The major commitment was an "Operation Creek Party". Operation Creek Party provided air refueling support to the U. S. Air Force, Europe (USAFE). For ten years, starting in 1967, the 134th was one of nine guard units which completed 70% of the air refueling operations of the Air Force in Europe. Operation Creek Party probably did more to introduce the Air Guard's capability to the members of the regular Air Force than any other activity in the history of the Guard.

Effective 1 July 1976, the unit was converted from TAC to the Strategic Air Command (SAC) and assigned the KC-135 aircraft. The 134th was the first Air Reserve Forces Unit to convert to the KC-135 in a record six months time. By 1982 the unit was completing another

transition, this one being a modification of the KC-135A. The turbo jet engines were replaced with turbo fan engines which greatly improved operational capabilities of the aircraft. The re-engined aircraft was redesignated the KC-135E.

Not only has the 134th distinguished itself with six different types of tactical aircraft, but it has also operated five different types of support aircraft. This unit has flown over 78,000 hours of accident free operations for over 27 years. The 134th has also off-loaded more than 155 million pounds of fuel during more than 70,000 in-flight refueling hookups. The 134th received the USAF Outstanding Unit Award for meritorious achievement for five periods: 1 July 1966 to 30 June 1968; 1 July 1973 to 30 June 1975; 1 July 1975 to 30 June 1976; 1 July 1981 to 30 June 1983 and 1 July 1983 to 30 June 1985.

In addition, the 134th has won the following awards and citations: Tennessee National Guard Commendation (1962), Air National Guard Meritorious Service Award (19 July 1977), eight USAF Flying Safety Awards, Tennessee National Guard Distinguished Unit Commendation (1979) and the Air Force Association Outstanding Air National Guard Unit of the Year Award for 1982.

In addition to its primary mission, the 134th Air Refueling Group supports the Air National Guard Professional Military Education Center, which consists of the Noncommissioned Officers Academy, Leadership School, and the Academy of Military Science. It also supports the 119th Tactical Control Flight, the 110th Tactical Control Flight, the 228th Combat Information Systems Squadron (AFCC), and the 572nd Air Force Band. Furthermore, by May 1978 the Army Aviation Support Group No. 2 was also a tenant of the Air National Guard after relocating on Guard property. The total population of the 134th and its tenant units is approximately 1300 personnel.

III. ENVIRONMENTAL SETTING

A. Meteorology

The following climatological data was obtained from the Soil Survey of Blount County, Tennessee; the National Oceanic and Atmospheric Administration (1983); and from Local Climatological Data: Narrative Climatological Summary; Knoxville, TN.

Blount County has a humid-temperate climate. The average annual temperature is nearly 60 ^{o}F. Winters are generally moderate with short term periods of cold weather in which temperatures frequently drop below 20 ^{o}F. Summers are usually hot with maximum temperatures exceeding 90 ^{o}F. Due to the mountains, great temperature changes are infrequent.

The average annual precipitation is approximately 46 inches with a net annual precipitation of 35 inches. A cumulative total of 12 inches of snow usually falls annually. Although the precipiation is fairly well distributed throughout the year, it is slightly greater in the wintertime. The periods of lowest rainfall during a 24 hour period usually occur in the Fall. The maximum amounts of rainfall over a 24 hour period occur during Spring and Summer thunderstorms. The winds are relatively light except during heavy thunderstorms.

B. Geology

The McGhee-Tyson ANGB is located within the Valley and Ridge physiographic province of eastern Tennessee. The Valley and Ridge is bordered by the Cumberland Plateau physiographic province to the west and the Blue Ridge Mountains physiographic province to the east. The Valley and Ridge is a continuous physiographic province which trends northeast - southwest from northern Georgia and Alabama to New York state. Areal distribution of the Valley and Ridge in relation to the McGhee-Tyson ANGB is illustrated in Figure III.1.

Surface topography throughout the Valley and Ridge province is a series of northeast - southwest trending ridges and valleys. These geographic features are the result of the differential weathering of outcropping surface formations. Topographic relief is quite significant with local relief frequently exceeding 400 feet. Mean sea level elevations within the vicinity of the Base range from a maximum elevation of 1395 feet to a minimum pool elevation of 813 feet along the Tennessee River.

Source: Wilson 1953

Location Map Valley and Ridge Physiographic Province of Eastern Tennessee

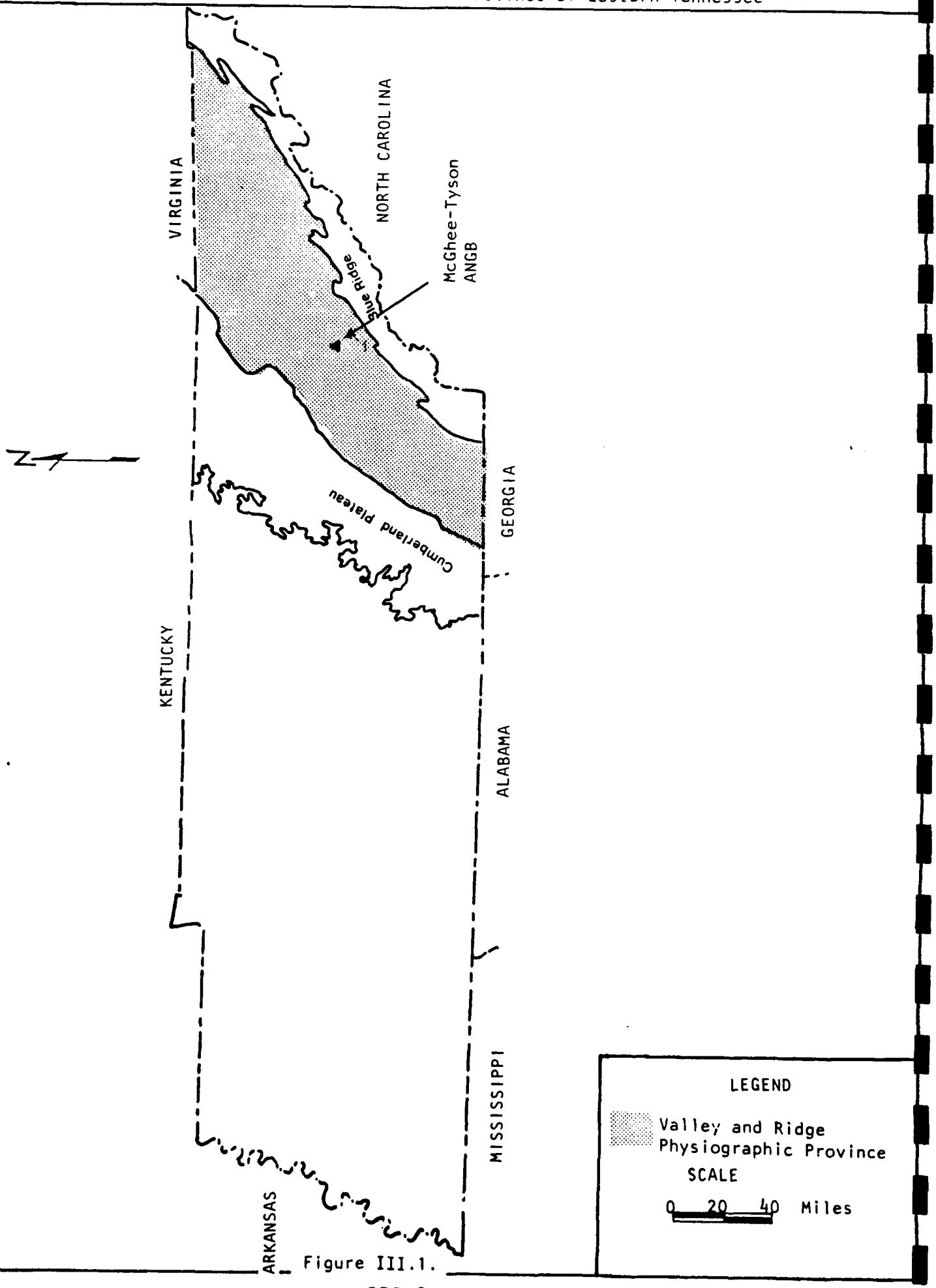


Figure III.1.

The Valley and Ridge stratigraphy of eastern Tennessee was deposited within the Appalachian Geosynclinal Basin. Valley and Ridge formations are sedimentary sequence which consists of limestones, dolomites, shales and sandstones. These units, which were deposited in ascending stratigraphic sequence, range in age from lower Cambrian to upper Silurian. The Valley and Ridge stratigraphy including formation stratigraphic sequence, formation lithology, and formation thickness is illustrated in Table III.1.

The gently dipping stratas of the Appalachian Basin were transformed into the complex structural geology of the Valley and Ridge province by the Appalachian Orogeny. During the Pennsylvanian and Permian ages of geologic time, the mountain building uplift of the Appalachian Orogeny exerted a compressional force to the northwest in which previous undisturbed Appalachian Basin formations were transformed into folded, faulted and highly deformed geological units.

Structural folds are numerous throughout the entire Valley and Ridge province. The most common types of Valley and Ridge folds are anticlinal and synclinal structures. Anticlinal folds are structural highs while synclinal folds are structural lows. However, because of the differential weathering of outcropping formations, Valley and Ridge surface topography does not reflect the underlying subsurface structure. Anticlinal and synclinal folds range in size from a few inches to tens of miles. The axial plane of large folds trend northeast - southwest while small folds are haphazardly oriented. Both anticlinal and synclinal folds throughout the Valley and Ridge province plunge in a random inconsistent direction.

The intensity of structural folding and deformation is related to the presence of faults and/or the individual formation lithology. Valley and Ridge folding has been observed to be the most intense within fault zones. Structural folds, which are associated with faults or fault zones include steeply dipping or frequently overturned anticlines and synclines. Structural dips ranging from 70 degrees to vertical have been observed in structural folds associated with faults. The intensity of anticlinal and synclinal folds is also affected by the individual formation lithology. Shales, which react to compressional stress as a plastic

Source: Hershey, 1973

Valley and Ridge Stratigraphic Formations On and In The Vicinity Of McGhee-Tyson ANGB

Age	Name		Character	Thickness (in feet)
SILURIAN	CLINCH SANDSTONE		Sandstone, quartzose, with some grit conglomerate, cross bedded, white except where iron stained.	200 feet preserved
UPPER ORDOVICIAN	SEQUATCHIE FORMATION		Mudstone, siltstone and shale, grayish-red; and silty limestone, gray.	450
	CHICKAMAUGA GROUP	MARTINSBURG SHALE	Shale and siltstone, sandy, calcareous, gray to greenish-gray, and limestone, argillaceous, gray, fossiliferous.	700+ +
MIDDLE ORDOVICIAN		BAYS FORMATION	Mudstones, silty, grayish-red; some with mud cracks; calcareous in upper part; with two thin zones of metabentonite in upper part.	700
		MOCCASIN FORMATION	Mudstones, calcareous, grayish-red, greenish-gray; with shrinkage cracks, mudcracks, ostracod zones; with thick zones of fossiliferous gray limestones; with two thin metabentonites in upper part.	950
		OTTOSEE SHALE	Shale, siltstone, some sandstone, and marble; shales and siltstones are brown, brownish gray, medium to dark gray, fossiliferous, calcareous; limestones are argillaceous to pure, gray; marble is pink and grayish red.	700-2000
		CHAPMAN RIDGE (TELLICO) SANDSTONE	Sandstone, calcareous and calcarenite, arenaceous, fossiliferous, cross-bedded, dark-greenish-gray to reddish-brown; with some shale interbeds similar to those of the Ottosee, and some beds of marble.	up to 900
		HOLSTON LIMESTONE	Marble, calcarenite, fine- to coarse-grained, shades of gray, pink, red; thick-bedded; with some interbeds of nodular gray limestone, fossiliferous	up to 525
		LENOIR LIMESTONE	Limestone, argillaceous or silty, gray, weathers nodular or cobbly, fossiliferous; with sedimentary breccias at base.	120-600
		MOSHEIM MEMBER	Limestone, aphanitic, gray, thick-bedded, with birdseyes	up to 150
LOWER ORDOVICIAN	KNOX GROUP	MASCOT DOLOMITE	Dolomite, finely crystalline, gray, some grayish-red, laminated or mottled, with stromatolites; with some aphanitic gray limestone; with unconformity at top, with some chert.	650
		KINGSPORT FORMATION	Dolomite, very finely crystalline, light-gray, and "recrystalline" dolomite, medium- to coarse-crystalline, medium-gray; limestone, aphanitic, gray; with collapse breccias and associated sphalerite deposits; with some chert.	300
		LONGVIEW DOLOMITE of Cattermole and Bridge	Dolomite, fine- to medium-crystalline, light-gray; with limestone, aphanitic, gray, and some "recrystalline," with abundant chert.	250-450
		CHEPULTEPEC DOLOMITE	Dolomite, fine-crystalline, light-gray; with prominent calcareous sandstone at base; cherty.	725-880

Table III.1.

Source: Hershey, 1973

Valley and Ridge Stratigraphic Formations On and In The Vicinity of The McGhee-Tyson ANGB

Age	Name		Character	Thickness (in feet)
UPPER CAMBRIAN	KNOX GROUP	COPPER RIDGE	Dolomite, medium- to coarse-crystalline, dark-gray, asphaltic, thick-bedded, with stromatolite bioherms, thin sandstones, lower part, upper part is light- to medium-gray dolomite and generally not as thick bedded; cherty, with oolites, cryptozoans preserved in residuum.	900-1100
	CONASAUGA GROUP	MAYNARDVILLE LIMESTONE	Lower member, limestone, ribboned or mottled; with stromatolites, oolites, intraclasts; upper member, straticulate dolomite and thick-bedded dark-gray non-cherty dolomite.	180-400
		NOLICHUCKY SHALE	Shale, dark-gray, grayish-red, olive-green, calcareous; and limestones, oolitic, intraclastic; with some stromatolites, some thin-bedded and fine-grained.	600-1400
MIDDLE CAMBRIAN		MARYVILLE LIMESTONE	Limestone, aphanitic to fine-crystalline, medium- to medium-dark-gray; some with oolites, intraclasts, generally thick-bedded.	250-700
		ROGERSVILLE SHALE	Shale, light-greenish-gray, pale-olive with a few beds of siltstone, limestone and dolomite.	100-325
		RUTLEDGE LIMESTONE	Limestone, gray, some argillaceous, mottled, some ribboned or banded, in places with dolomite at the top; in places with interbeds of shale.	115-325
		PUMPKIN VALLEY SHALE	Shale and siltstone, reddish-brown to grayish-red, greenish-gray and olive-gray; with thin sandstones, limestones and dolomites in some places.	100-750
CAMBRIAN		ROME FORMATION	Sandstone, siltstone and shale; some rippled, generally with an abundance of primary sedimentary features; gray, brown, orange, yellow, greenish gray and grayish red.	450+ - 1500+; faulted at base.
		SHADY DOLOMITE	Identified by Cattermole from Saprolite in eastern Knox County; saprolite is reddish-brown to greenish-gray clay, siliceous, with banded chert.	

Table III.1. Continued

substance, are compressed with slight resistance into steeply dipping folds. In contrast carbonates, which are highly resistant to compressional stress, develop broad open folds. When folded carbonates attain the maximum resistance to compressional stress, the result is the development of faults, fractures, and brecciation.

Low angle thrust faults are the most common type of faults, which occur within the Valley and Ridge province. Thrust faults develop when there is a plane of breakage within a formation sequence, which results from prolonged stress and compressional deformation. Formations were moved to the northwest along southeast dipping thrust fault planes in which formations of older geologic age were displaced to overlie younger geologic age formations. Movement or displacement of formations ranges from a few inches to hundreds of miles. Thrust fault exposures at the land surface illustrate a steeply dipping fault plane which frequently exceeds 70 degrees. However, this fault plane dip exposed in surface outcrops will become gentle and frequently horizontal in the subsurface.

Regional thrust faults which trend northeast - southwest traverse the entire Valley and Ridge province. The surface fault trace is quite extensive, frequently covering hundreds of miles. The surface exposed fault may be a single exposed displacement or a fault zone with a series of branching faults. Fault zones associated with major thrust faults are the result of prolonged compressional deformation which proceeded the initial fault plane displacement.

The McGhee-Tyson ANGB is located between two major Valley and Ridge thrust faults. These faults are the Chestuee and Dumplin Valley overthrusts. The Base site is located directly adjacent to the Chestuee overthrust (Figure III.2). Surface stratigraphy at the Base as described in the Geology of the Maryville Quadrangle (Cattermole 1962) is the undifferentiated Knox group. Structure within the Chestuee overthrust involves the overriding of the Knox group upon the younger Ordovician age Otassee shale and Chapman Ridge sandstone. Structural deformation at the Base site could include folding and possible fracturing and brecciation of the Knox group.

As previously mentioned, the surface stratigraphy at the Base underlying the soil and weathered overburden is the undifferentiated Knox group. Within his region the individual Knox units e.g., Mascot, Kingsport, Longview, Chepultepec and Copper Ridge have not been differentiated as separate individual formations. Knox

Source: Cattermole, 1962

Major Faults and Geologic Cross Section For McGhee-Tyson ANGB

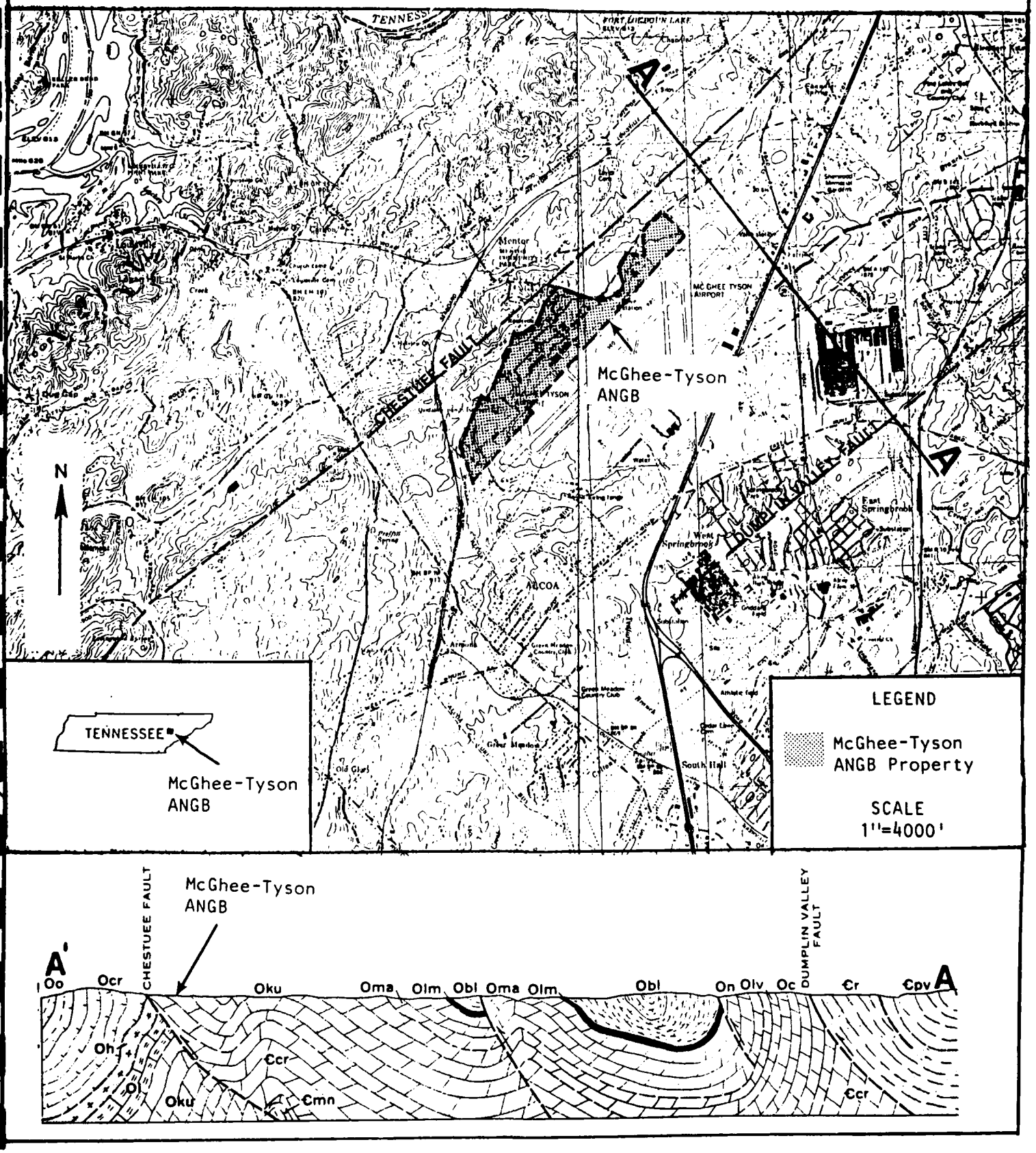


Figure III.2.

Source: Cattermole, 1962

Legend For Figure III.2. Geologic Cross Section

"LEGEND"

Oo.....Ordovician Ottosee Shale
Ocr.....Ordovician Chapman Ridge sandstone
Oh.....Ordovician Holston formation
Ol.....Ordovician Lenoir limestone
Obl.....Ordovician Blockhouse shale
Olm.....Ordovician Moseim member
Oma.....Ordovician Mascot formation
Ok.....Ordovician Kingsport formation
Olv.....Ordovician Longview dolomite
Oc.....Ordovician Chepultepec dolomite
On.....Ordovician Newala formation
Oku.....Ordovician Knox group
€cr.....Cambrian Copper Ridge
€mn.....Cambrian Maynardville
€n.....Cambrian Nolinchucky shale
€m.....Cambrian Maryville limestone
€rg.....Cambrian Rogersville shale
€rt.....Cambrian Rutledge limestone
€pv.....Cambrian Pumpkin Valley
€r.....Cambrian Rome

Figure III.2.

lithology at the Base is a tan-gray finely crystalline dolomite. Although normal Knox group thickness exceeds 2000 feet, there will be variations in Knox thickness at the Base site as a result of the adjacent Chestuee overthrust.

C. Soils

The United States Department of Agriculture (USDA) Soil Conservation Service (SCS) has classified soils both on and in the vicinity of the Base to occur within the Dewey, Dunmore, Decator Association. Soils within this association are quite deep as evidenced by soil borings, reaching bedrock 50 to 100 feet below the land surface. Individual soil types include clay, silty clay, and silty clay loam. Estimated soil clay composition, which is derived from mechanical sieve analysis, will increase with depth. Weathered chert fragments randomly occur throughout the entire soil profile. Soil permeability as tested by the SCS to a maximum depth of 5 feet ranges from 0.2 to 0.8 inches/hour. The soil pH has been evaluated to range from 5.1 to 6.1.

D. Hydrogeology

Surface Water

Surface water within the Base complex is collected in a series of manmade ditches, storm sewers, and drainage swales. This surface water is discharged at the southwest end of the Base at the main storm drain exit adjacent to the Base sewage treatment facility. A small portion of the Base surface drainage is discharged at the northeast end of the Base through a series of manmade ditches and drainage swales. Both Base surface drainage routes discharge into the Lackey creek watershed which is a tributary of the Tennessee River (Figure III.3 and III.4). The Lackey Creek - Tennessee River confluence is located approximately 3 miles northwest of the Base boundary. Both the Tennessee River and Lackey Creek have been impounded by the Tennessee Valley Authority (TVA) Ft. Loudon Reservoir. According to the Blount County Planning Commission, the Base is within the 100 year flood plain.

The Base surface drainage, which discharges at the main storm drain exit, was observed to sink, underground directly adjacent to the southwest Base boundary. This observation along with visible topographic sinkholes illustrates that underground drainage may be more prevalent at the Base than surface drainage. Base surface water routes may predominately be an exit or overflow route for excess surface water during periods of heavy precipitation.

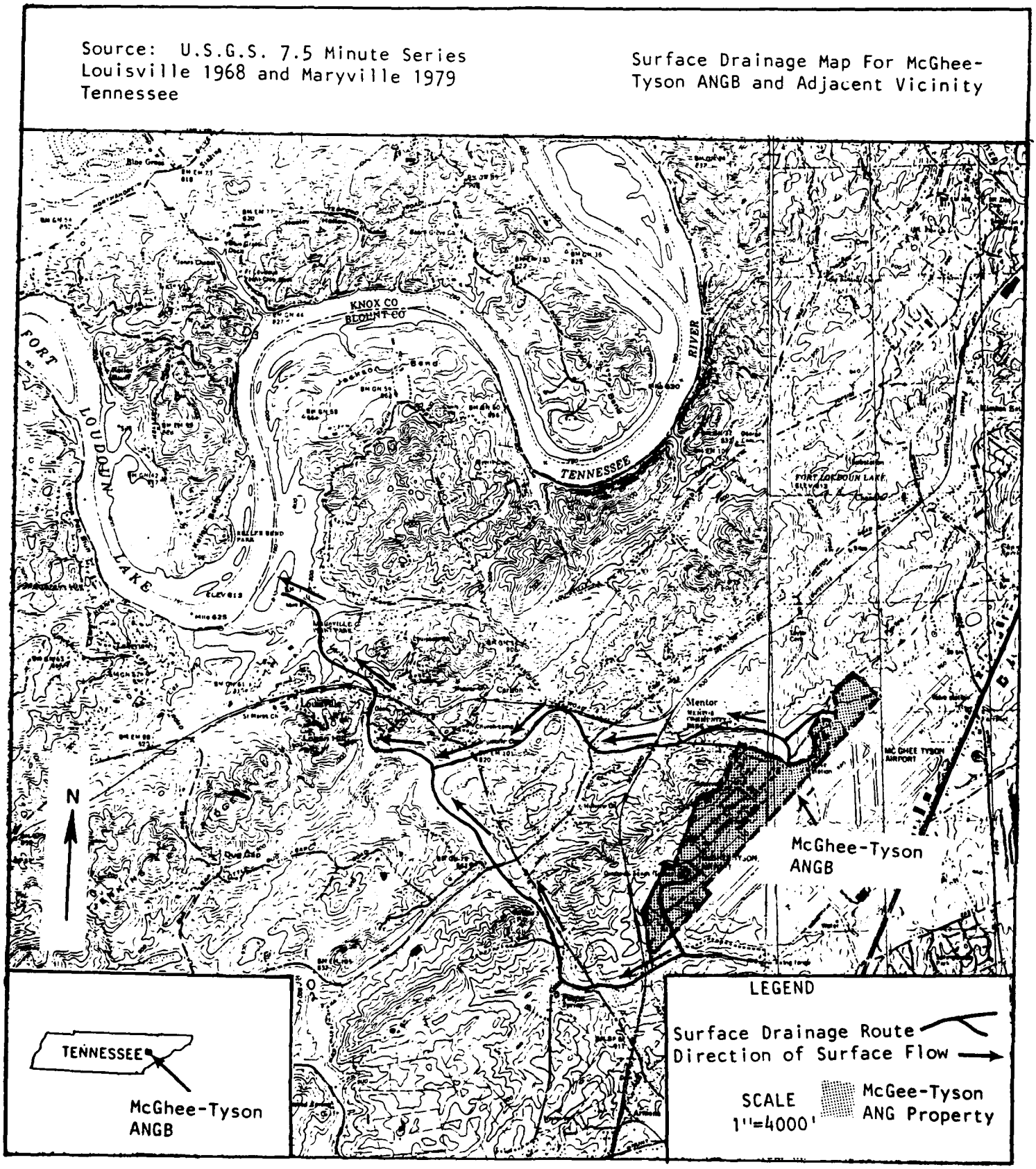
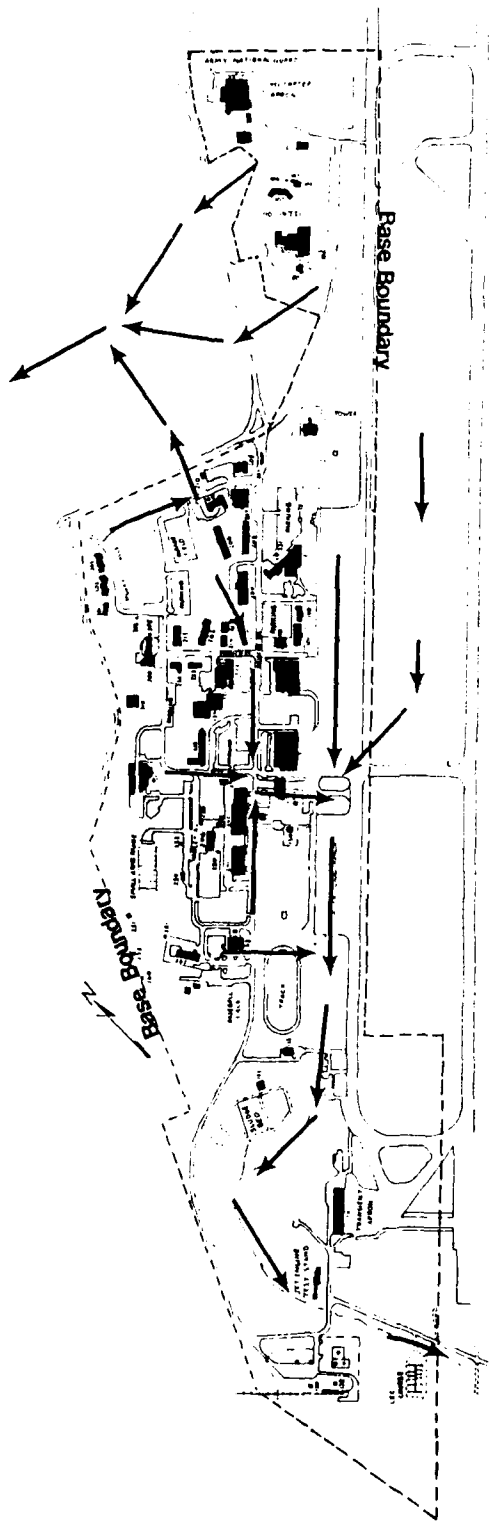

Source: U.S.G.S. 7.5 Minute Series
Louisville 1968 and Maryville 1979
Tennessee
Surface Drainage Map For McGhee-Tyson ANGB and Adjacent Vicinity
KNOX CO
BLOUNT CO
FORT LOUDOUN LAKE
TENNESSEE RIVER
Louisville
Carson
Mentor
McGhee-Tyson ANGB
N
TENNESSEE
McGhee-Tyson ANGB
LEGEND
Surface Drainage Route
Direction of Surface Flow
SCALE 1"=4000'
McGee-Tyson ANG Property

Figure III.3.

Source: McGhee-Tyson ANG
Civil Engineering

McGhee-Tyson ANGB Surface Water
Drainage Routes



LEGEND

Paved Roads/Parking Lots
Streams/Ditches
Property Line
Buildings
Direction of Base Surface Water Drainage

SCALE
1"=845'

Figure III.4.

Groundwater

The complex structural geology of the Valley and Ridge province has a significant effect upon the hydrology of Valley and Ridge formations. Structural uplift, deformation, and thrust faulting affects groundwater recharge, migration, and discharge. Valley and Ridge thrust faults may be both a pathway and barrier to groundwater migration. Groundwater migration occurs throughout the majority of Valley and Ridge formations by secondary fractured and brecciated permeability which resulted from compressional deformation. Secondary fractured permeability is enlarged in carbonate formations by the solution of percolating surface water. The reservoir capacity of individual aquifers is controlled by the intensity of interconnecting fractures. Primary intergranular porosity or confined aquifers are not constituents of the Valley and Ridge hydrology.

Valley and Ridge groundwater recharge and discharge occurs as percolating surface water, which migrated downgradient and discharges into the local streams and/or resurgent springs. There are three types of resurgent springs throughout the Valley and Ridge Province. These springs include Depression springs, Contact springs, and Tubular springs. Depression springs flow when the land surface extends to the water table. A contact spring occurs when water flows at the land surface from a permeable formation at the outcrop or contact of an underlying less permeable formation that impedes the downward percolation of groundwater. Tubular springs flow at the land surface from a large opening or cavern in a permeable formation.

The principal Valley and Ridge aquifers both within the boundaries and in the immediate vicinity of the Base are the weathered soil overburden and the Knox dolomite. Additional Valley and Ridge aquifers are not prevalent within the immediate proximity of the Base boundaries. The soil overburden, which is primarily composed of clay and weathered chert fragments, is the shallow groundwater reservoir for percolating surface water derived from precipitation. Shallow groundwater migration and discharge into the local streams is limited by high soil clay composition and low soil permeability. Shallow groundwater, which is occasionally used as a domestic water source, infrequently occurs where chert fragments have become concentrated within a distinct stratigraphic interval. Saturated groundwater intervals also occur along the soil-Knox interface.

The USDA has concluded that the seasonal high ground water table is deeper than 20 feet below the land surface. Borings at the Base site, which were drilled during the months of July and August, penetrated moderately saturated groundwater at a depth of 29 feet below ground surface. It was speculated by the contracting geotechnical firm that the shallow water table will vary with the amounts of seasonal precipitation.

The Knox group, which underlies the weathered soil overburden at the Base, is the most proficient aquifer throughout the Valley and Ridge province. Groundwater migration is controlled by a system of intricate and interconnected fractured, secondary permeability. As previously mentioned, the capacity of this fractured permeability has been enlarged by the solution of percolating groundwater. Typical Knox fine crystalline dolomite contains very slight or no primary porosity or permeability.

Potable water wells, which produce from the Knox aquifer are drilled to depths ranging from 125-300 feet below ground surface. Knox fractured permeability decreases at depths greater than 300 feet as a result of the sparry calcite infiltration of Knox brecciated fractures. The majority of Knox water wells produce from aquifers which range in depth from 200-250 feet below ground surface. These Knox aquifers produce from the previously described secondary porosity and permeability (Figure III.5). The yield for Knox wells in the vicinity of the Base ranges from 25 to 175 GPM.

The Knox aquifer is recharged by the overlying soil overburden. Shallow groundwater, which is stored in the soil overburden, percolates downward and saturates the interconnecting Knox brecciated fractures. Topographic evaluation of the entire Base illustrates that the higher elevation within the Base boundaries may be an area of Knox aquifer recharge.

The Chestuee thrust fault, which crops out 500 feet northwest of the Base, has a significant effect upon the Knox groundwater discharge. The Chestuee fault is the surface contact of the Knox dolomite and Chapman Ridge sandstone (Figure III.2). Knox groundwater at the Base migrates to the northwest perpendicular to regional strike. Migrating Knox groundwater upon contact with the Chestuee fault is unable to penetrate the Chapman Ridge sandstone. Since the Knox dolomite is more permeable than the Chapman Ridge sandstone, the migration of Knox groundwater at the Chestuee fault changes direction to migrate southwest or northeast parallel to regional strike. The migrating Knox

Source: Hershey, 1973

Knox Aquifer Fractured Permeability

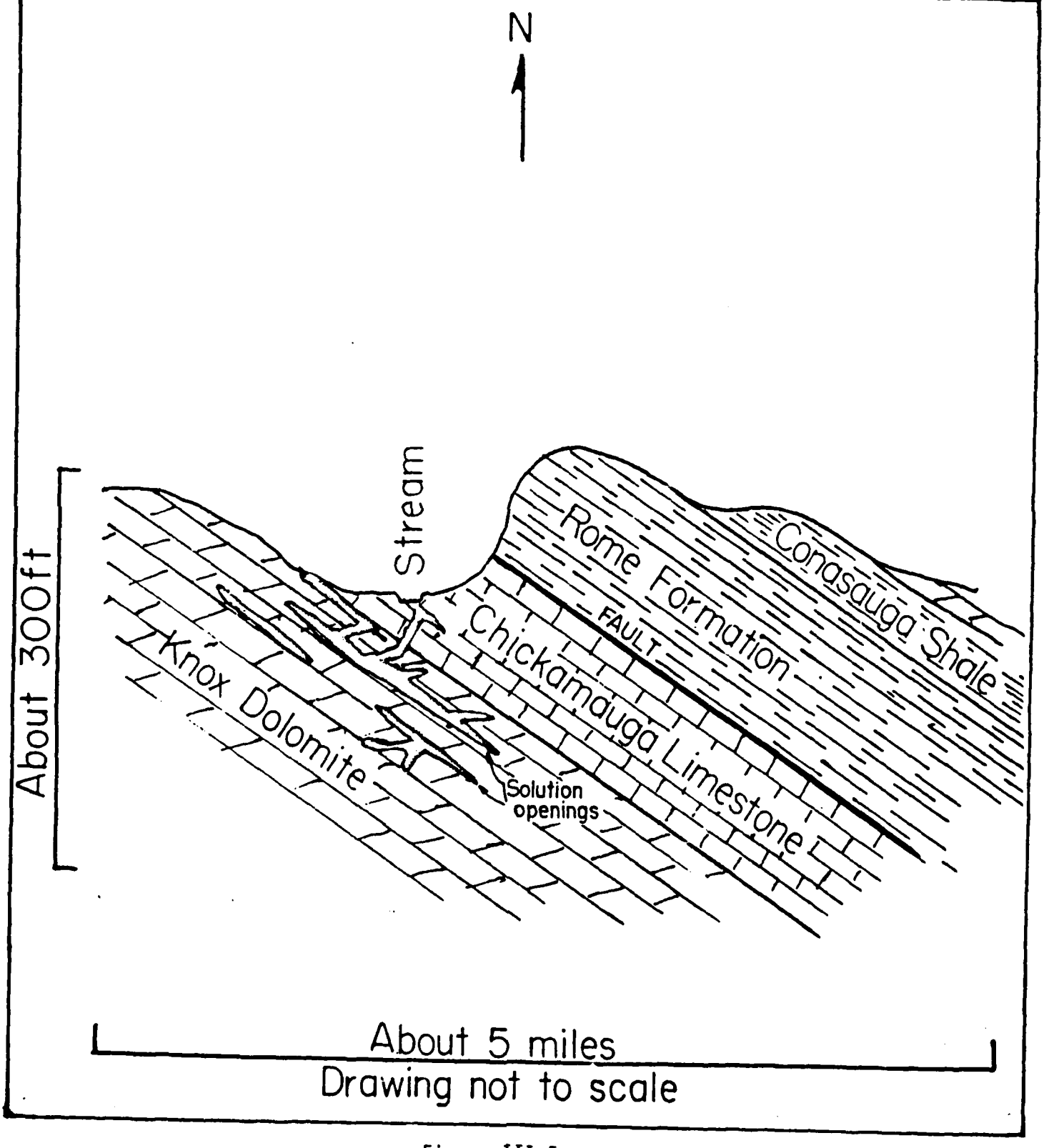


Figure III.5.

groundwater discharges along the Chestuee fault as large contact springs. Contact spring discharge rates as evaluated by the USGS range from 300 to 1500 GPM. This concept is quite evident by the large number of contact springs which concentrate along the surface outcrop of the Chestuee fault. Profitt Spring, which is located 2500 feet southwest of the Base boundary, is the probable discharge for Knox groundwater which underlies the Base.

The water supply for the Base is municipal water purchased from the City of Alcoa. The source for the City of Alcoa municipal water is the Little River approximately 4 miles northeast of the Base boundary. Correspondence with numerous Base interviewees indicated that throughout the Base history e.g., 1957 -Present, no water wells have been drilled and are producing within the Base boundaries.

Correspondence with the Tennessee Department of Health and Environment Division of Groundwater Resources and the City of Alcoa Department of Utilities has indicated that the majority of residential population surrounding the Base use municipal water purchased from the City of Alcoa as a domestic water source. Figure III.6 illustrates the domestic water wells within a 3 mile radius of the Base. As illustrated in Figure III.6, the water well most adjacent to the Base is located approximately 0.5 mile northwest of the Base boundary.

As previously mentioned, shallow groundwater, which is stored in the soil overburden, will recharge the underlying Knox aquifer rather than discharge into the local streams. Knox groundwater, which migrates through a system of interconnected fractured permeability, will be a direct conduit to resurgent springs, potable water wells, or additional zones of discharge. Also, groundwater movement through a fractured permeability will migrate at a faster rate and will not be filtered or diluted from pollutants to the same degree as groundwater movement through primary porosity or permeability. With the limited use of potable water wells as a domestic water source directly adjacent to the Base boundary, there is not a major threat to potential receptors from potentially contaminated well water.

Source: U.S.G.S. 7.5 Minute Series
Louisville 1968 and Maryville 1979 Tennessee

Potable Water Well Locations
For McGhee-Tyson ANGB and
Vicinity

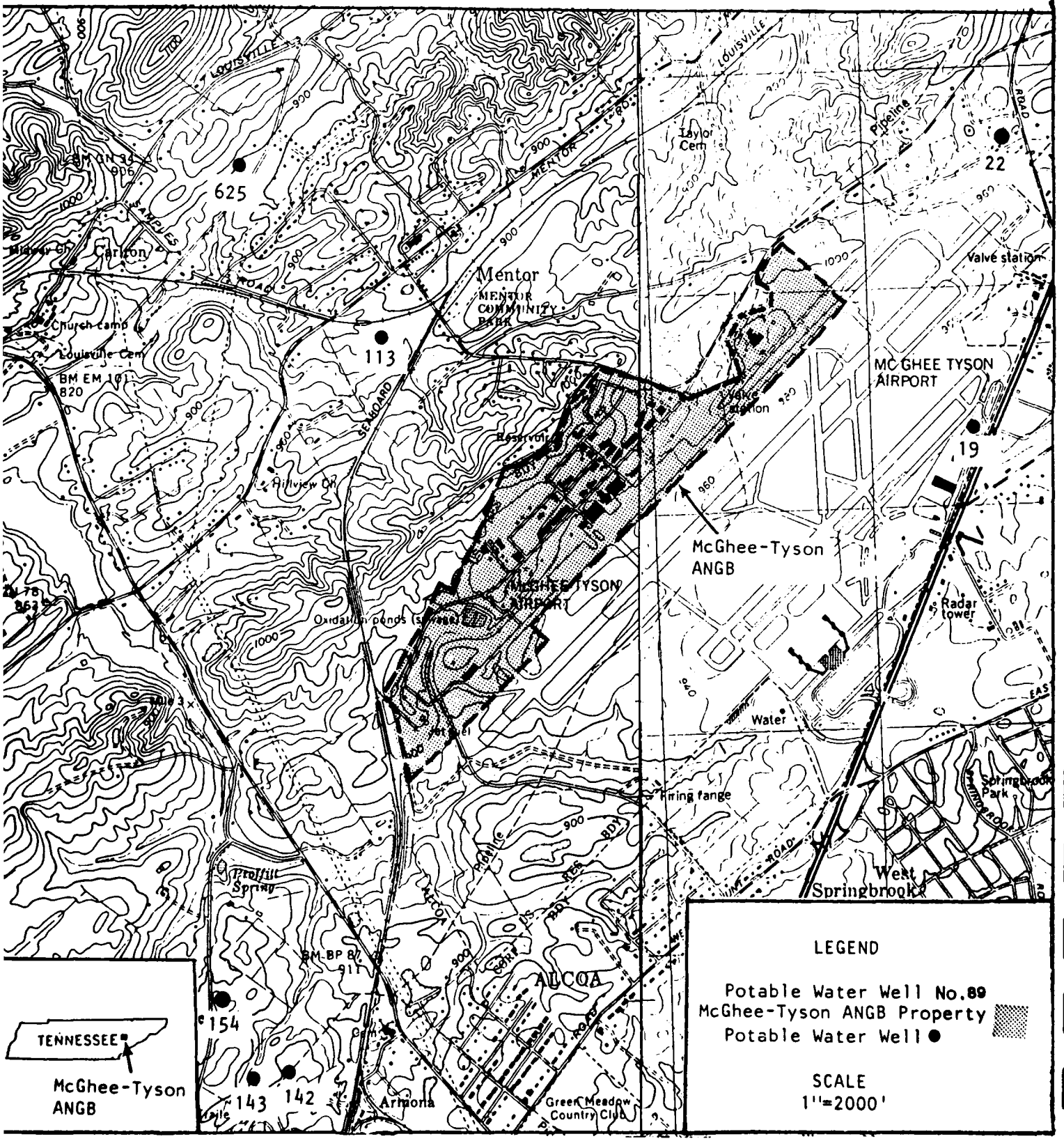


Figure III.6.

IV. SITE EVALUATION

A. Activity Review

The review of Base records plus interviews with present and former Base personnel identified specific operations in which the majority of hazardous materials and/or hazardous wastes are used, stored, processed and disposed. Table IV.1 summarizes the major operations associated with each activity. If an item is not listed in the table on a best-estimated basis, that activity or operation produces negligible (estimated less than five gallons per year) waste requiring disposal.

Table IV.2 summarizes the hazardous materials and/or hazardous wastes which are used, stored, or disposed of by the Army Air National Guard.

The building numbers and building identification for individual facilities throughout the Base are shown in Table IV.3.

Data for all underground storage tanks (USTs) are summarized in appendix H, as Tables H.1 and H.2. The location of each UST and oil/water (o/w) separator is presented in Figure IV.1.

The liquid fuel system at McGhee-Tyson ANGB receives, stores, and dispenses JP-4 jet fuel as well as the normal motor fuels and heating oil.

JP-4 is the principal fuel handled by the Base; and, because of its mission the fuel is handled in very large quantities. The JP-4 is used for refueling jet aircraft operating out of the Base as well as its main task to load the KC-135 tanker aircraft for aerial refueling operations. JP-4 is also used in maintenance work.

The POL facility receives JP-4 by commercial tank trucks in the main POL area where it is stored in three above ground tanks. JP-4 is then transferred to two underground tanks in the intermediate POL storage area. Fuel is pumped from the intermediate POL storage area to the aircraft loading header. An underground defueling receiving tank collects excess fuel which is returned to the intermediate storage area for reuse.

Because of an excellent filtering and dewatering system, the off-spec JP-4 tank is not used (it is filled with water) and excess fuel is continuously reclaimed.

TABLE IV.1. HAZARDOUS MATERIALS/HAZARDOUS WASTE SUMMARY
McGHEE-TYSON ANGB
KNOXVILLE, TENNESSEE

Shop	Building No. (Past & Present)	Hazardous Materials/ Hazardous Waste	Estimated Quantities (Gal/Year)	1960	1970	1980	1985	Present
Corrosion Control	113	Thinners/Strippers	210	UNK	UNK	DRMO	DRMO	DRMO
		Polyurethane	6	UNK	UNK	DRMO	DRMO	DRMO
		PD-680	200	FTA	FTA	DRMO	REC	REC
		Lacquer	55	UNK	UNK	DRMO	DRMO	DRMO
Machine Shop	113	Grease	4	PROC	PROC	PROC	PROC	PROC
		Penetrating Fluid	3	UNK	ST	SAN	SAN	SAN
		Cutting Oil	2	UNK	ST	SAN	SAN	SAN
		Lubricating Oil	4	PROC	PROC	PROC	PROC	PROC
Sheet Metal Shop Metal Processing	113	Zinc Chromate	5	UNK	UNK	PROC	PROC	PROC
		MEK	12	UNK	UNK	PROC	PROC	PROC
		Lub. Compound	48	UNK	UNK	PROC	PROC	PROC
		Trichloroethane	12	UNK	UNK	PROC	PROC	PROC
Support Equiptment	113	Hydraulic Fluid	2860	UNK	CONTR	DRMO	DRMO	DRMO
		Ethylene Glycol	55	ST	SAN	SAN	SAN	SAN
		Polyurethane	5	UNK	UNK	DRMO	DRMO	DRMO
		Zinc Chromate	10	UNK	UNK	DRMO	DRMO	DRMO
		Thinners & Strippers	35	UNK	UNK	PROC	DRMO	DRMO
		Lacquer	200	UNK	UNK	CONTR	CONTR	CONTR
Periodic Maintenance Dock	113	PD-680	100	FTA	FTA	DRMO	REC	REC
		Jet Engine Oil	200	UNK	CONTR	DRMO	DRMO	DRMO
		Hydraulic Fluid	600	UNK	CONTR	DRMO	DRMO	DRMO
		JP-4	600	FTA	FTA	PROC	PROC	PROC
		Grease	3 lbs.	PROC	PROC	PROC	PROC	PROC
		Instrument Oil	3	PROC	PROC	PROC	PROC	PROC
		Corrosion Prev. Compound	60 lbs.	UNK	UNK	PROC	PROC	PROC
		General Purpose Oil	24	PROC	PROC	PROC	PROC	PROC
		Trichloroethane	2	UNK	UNK	PROC	PROC	PROC

TABLE IV.1. (CONT.)

Shop	Building No. (Past & Present)	Hazardous Materials/ Hazardous Waste	Estimated Quantities (Gal/Year)	1960	1970	1980	1985	Present
Entomology	320	Final Rat Bait	5 lbs.	UNK	UNK	CONTR	CONTR	CONTR
		Insecticide-Aerosol	6-12 Cans	UNK	UNK	CONTR	CONTR	CONTR
		Chlorphyrifus	1.5	UNK	UNK	CONTR	CONTR	CONTR
		Pyrethrum	4	UNK	UNK	CONTR	CONTR	CONTR
		Round-Up Herbicide	5	UNK	UNK	CONTR	CONTR	CONTR
		Paraquat	6.5	UNK	UNK	CONTR	CONTR	CONTR
		Bolt Insecticide	10.5 oz.	UNK	UNK	CONTR	CONTR	CONTR
		Hoss Granular Weed Killer	50 lbs.	UNK	UNK	CONTR	CONTR	CONTR
Civil Engineering	320	Penetrating Oil	6	UNK	ST	SAN	SAN	SAN
		Grease	12	PROC	PROC	PROC	PROC	PROC
		Mogas-Leaded	1820	UNK	UNK	PROC	PROC	PROC
		Lubricating Slyde	6	PROC	PROC	PROC	PROC	PROC
		Engine Oil	520	FTA	FTA	DRMO	DRMO	DRMO
		Sulfuric Acid	310	NS	NS	NS	NS	NS
		Mogas-Unleaded	14	UNK	UNK	PROC	PROC	PROC
Vehicle Maintenance 228th Communications Squadron	262	Denatured Alcohol	12	PROC	PROC	PROC	PROC	PROC
		Ethylene Glycol	52	ST	SAN	SAN	SAN	SAN
		Brake Fluid	24	UNK	UNK	DRMO	DRMO	DRMO
		Carbon Remover	5	UNK	UNK	SAN	SAN	SAN
		Cleaning Compound	12	UNK	UNK	SAN	SAN	SAN
		Engine Oil	480	FTA	FTA	DRMO	DRMO	DRMO
		Sulfuric Acid	52	NS	NS	NS	NS	NS
		Thinners	24	UNK	ST	DRMO	DRMO	DRMO
Vehicle Maintenance	246	Enamel	40	UNK	UNK	DRMO	DRMO	DRMO
		Polyurethane	30	UNK	UNK	DRMO	DRMO	DRMO
		Thinners/Strippers	185	UNK	UNK	DRMO	DRMO	DRMO
		Zinc Chromate	6	UNK	DRMO	DRMO	DRMO	DRMO
		Denatured Alcohol	55	PROC	PROC	PROC	PROC	PROC
		Battery Acid	75	NS	NS	NS	NS	NS
		Safety Kleen Solvent	150		UNK	CONTR	CONTR	CONTR
		Carbon Cleaner	30	UNK	UNK	SAN	SAN	SAN
		Ethylene Glycol	220	ST	SAN	SAN	SAN	SAN

TABLE IV.1. (CONT.)

Shop	Building No. (Past & Present)	Hazardous Materials/ Hazardous Waste	Estimated Quantities (Gal/Year)	1960	1970	1980	1985	Present
Vehicle Maintenance "Continued"	246	Starting Fluid	4	PROC	PROC	PROC	PROC	PROC
		Degreaser	55	UNK	UNK	SAN	SAN	SAN
		Glass Cleaner	6	UNK	UNK	SAN	SAN	SAN
		Mogas-Unleaded	15,000	UNK	UNK	PROC	PROC	PROC
		Mogas-Leaded	35,000	UNK	UNK	PROC	PROC	PROC
		Diesel	7,000	UNK	UNK	PROC	PROC	PROC
		Carbon Tetrachloride	3	UNK	UNK	PROC	PROC	PROC
		Contact Cleaner	3	UNK	UNK	PROC	PROC	PROC
		Engine Oil	660	FTA	FTA	DRMO	DRMO	DRMO
Avionics	110	Sealing Compound	4	UNK	UNK	PROC	PROC	PROC
		Corrosion Prev. Compound	4	UNK	UNK	PROC	PROC	PROC
		Deglazing Solvent	4	UNK	UNK	PROC	PROC	PROC
		Naptha	1	UNK	UNK	PROC	PROC	PROC
		Contact Cleaner	12	PROC	PROC	PROC	PROC	PROC
		Trichloroethane	1	UNK	UNK	PROC	PROC	PROC
		Lubricating Compound	5	PROC	PROC	PROC	PROC	PROC
		Grease	1	PROC	PROC	PROC	PROC	PROC
NDI Lab.	135	Methyl Chloroform	10	UNK	PROC	PROC	PROC	PROC
		Fluorescent Dye Penetrant	5	UNK	PROC	PROC	PROC	PROC
		Developer	10	UNK	SAN	SAN	SAN	SAN
		Fixer	10	UNK	UNK	DRMO	DRMO	DRMO
		Magnetic Inspection Oil	5	UNK	PROC	PROC	PROC	PROC
110/119 Tactical Control Flight	100 102	7808 Oil	65	UNK	CONTR	DRMO	DRMO	DRMO
		MoGas	5000	UNK	UNK	PROC	PROC	PROC
		JP-4	560	FTA	FTA	PROC	PROC	PROC
		Diesel	1200	FTA	FTA	PROC	PROC	PROC
		Parts Cleaner	35	UNK	ST	CONTR	CONTR	CONTR
		Motor Oil	100	FTA	FTA	CONTR	CONTR	CONTR
		Aircraft Cleaning Compound	45	UNK	ST	ST	ST	ST
		Trichloroethane	1	UNK	UNK	PROC	PROC	PROC
		Engine Oil	400	FTA	FTA	CONTR	CONTR	CONTR
		Sulfuric Acid	24	NS	NS	NS	NS	NS

TABLE IV.1. (CONT.)

Shop	Building No. (Past & Present)	Hazardous Materials/ Hazardous Waste	Estimated Quantities (Gal/Year)	1960	1970	1980	1985	Present
110/119 Tactical Control Flight "Continued"	100	Ethylene Glycol	150	ST	SAN	CONTR	CONTR	CONTR
	102	Lubricating Oil	10	UNK	UNK	CONTR	CONTR	CONTR
		Hydraulic Oil	10	UNK	UNK	CONTR	CONTR	CONTR
		Thinner	250	UNK	UNK	CONTR	CONTR	CONTR
		Brake Fluid	10	UNK	UNK	CONTR	CONTR	CONTR
		Dichlorodifluoromethane	60	PROC	PROC	PROC	PROC	PROC
		Enamel	44	UNK	UNK	CONTR	CONTR	CONTR
Radio Maintenance	263	Contact Cleaner	3	PROC	PROC	PROC	PROC	PROC
		Lubricating Oil	1	PROC	PROC	PROC	PROC	PROC
		Trichlorotrifluoroethane	1	PROC	PROC	PROC	PROC	PROC
Life Support	103	Paint	13	ST	ST	DRMO	DRMO	DRMO
		MEK	12	UNK	UNK	PROC	PROC	PROC
		Toluene	12	UNK	UNK	PROC	PROC	PROC
		Isopropyl Alcohol	10	PROC	PROC	PROC	PROC	PROC
		Trichlorotrifluoroethane	120	PROC	PROC	PROC	PROC	PROC
		Dichloromethane	3	UNK	UNK	PROC	PROC	PROC
		Lubricating Compound	2	UNK	PROC	PROC	PROC	PROC
Wheel & Tire	111	Ethyl Alcohol	10	PROC	PROC	PROC	PROC	PROC
Fuel		Isopropyl Alcohol	5	PROC	PROC	PROC	PROC	PROC
Pneudraulics		Naptha	5	UNK	UNK	PROC	PROC	PROC
Electrical		MIK	5	UNK	UNK	PROC	PROC	PROC
Environmental		Flourescent Penetrant	5	UNK	UNK	PROC	PROC	PROC
		Amyl Acetate	1	UNK	PROC	PROC	PROC	PROC
		Primer Polysulfide	1	UNK	PROC	PROC	PROC	PROC
		JP-4	52	FTA	FTA	PROC	PROC	PROC
		PD-680	55	FTA	FTA	REC	REC	REC
		Cleaning Solvent	50	UNK	UNK	SAN	SAN	SAN
		Hydraulic Fluid	57	UNK	CONT	REC	REC	REC
		Ammonia Hydroxide	4	UNK	UNK	PROC	PROC	PROC
		MEK	10	UNK	UNK	PROC	PROC	PROC
		Trichloroethane	15	UNK	UNK	PROC	PROC	PROC

TABLE IV.1 (CONT.)

Shop	Building No. (Past & Present)	Hazardous Materials/ Hazardous Waste	Estimated Quantities (Gal/Year)	1960	1970	1980	1985	Present
Wheel & Tire	111	Paint	5	UNK	UNK	DRMO	DRMO	DRMO
Fuel		General Purpose Oil	6	PROC	PROC	PROC	PROC	PROC
Pneudraulics		7808 Oil	90	UNK	CONTR	DRMO	DRMO	DRMO
Electrical		Lubricating Compound	52	PROC	PROC	PROC	PROC	PROC
Environmental		Cleaning Compound	165	UNK	UNK	CONTR	DRMO	DRMO
"Continued"		Carbon Cleaner	15	UNK	UNK	PROC	PROC	PROC
		Degreaser	220	UNK	UNK	SAN	SAN	SAN
AGE	126	Polyurethane	40	UNK	UNK	DRMO	DRMO	DRMO
		Enamel	10	UNK	UNK	DRMO	DRMO	DRMO
		Lacquer	2	UNK	UNK	DRMO	DRMO	DRMO
		Zinc Chromate	5	UNK	UNK	DRMO	DRMO	DRMO
		Thinners/Strippers	30	UNK	UNK	DRMO	DRMO	DRMO
		PD-680	220	FTA	FTA	REC	REC	REC
		Cleaning Solvent	220	UNK	UNK	DRMO	DRMO	DRMO
		Battery Acid	40	NS	NS	NS	NS	NS
		Engine Oil	330	FTA	CONTR	DRMO	DRMO	DRMO
		Parts Cleaner	120	UNK	UNK	PROC	PROC	PROC
		Turbine Oil	24	UNK	CONTR	DRMO	DRMO	DRMO
		Mogas	5,200	UNK	UNK	PROC	PROC	PROC
		Diesel	5,200	UNK	UNK	PROC	PROC	PROC
		Varsol	160	UNK	UNK	UNK	DRMO	DRMO
		Ethylene Glycol	165	ST	SAN	SAN	SAN	SAN
Jet Engine	126	Trichloroethane	4	UNK	UNK	PROC	PROC	PROC
		PD-680	220	FTA	FTA	REC	REC	REC
		Carbon Cleaner	120	UNK	UNK	REC	REC	REC
		Cleaning Fluid	120	UNK	UNK	REC	REC	REC
		Penetrating Fluid	6	UNK	UNK	PROC	PROC	PROC
		Aircraft Grease	12 lbs.	PROC	PROC	PROC	PROC	PROC
		Hydraulic Fluid	36	UNK	CONTR	DRMO	DRMO	DRMO
		Cleaning Solvent	175	UNK	UNK	PROC	PROC	PROC

ACRONYMS

PROC - Disposed of in process.
CONTR - Disposed of by contractor.
FTA - Disposed of at fire training area.
NS - Neutralized and disposed in sanitary sewer.
ST - Disposed of by drains to storm sewer
REC - Recycled waste.
DRMO - Disposed of through DRMO
UNK - Unknown disposal method.
SAN - Disposed of by sanitary sewer.

TABLE IV.2. HAZARDOUS MATERIALS/HAZARDOUS WASTE SUMMARY ARMY NATIONAL GUARD

Building	Hazardous Materials/ Hazardous Waste	Estimated Maximum Quantity (Gal/Year)	Disposal Method
Army Helicopter Hangar	PD-680	200	DRMO
	Thinners	6	DRMO
	Hydraulic Fluid	72	DRMO
	Acetone	6	PROC
	Naptha	12	PROC
	MEK	6	PROC
	JP-4	120,000	PROC
	Denatured Alcohol	2	PROC
	Oil	6	DRMO
	Potassium Hydroxide	3	DRMO
	Safety Kleen Solvent	220	CONTR

ACRONYMS:

DRMO - Disposed of through DRMO.
PROC - Disposed of in process.
CONTR - Disposed of by contractor.

TABLE IV.3 TN ANG BUILDING

NUMBER AND IDENTIFICATION

BLDG.	DESCRIPTION
2	Flag Pole
13	Sanitary Latrine
15	Outdoor Rec. Pavillion
100	Readiness (Alert) Crew Quarters
100	110th/119th Squadrons AGE/Comm. Maint. (RADAR)
101	Wpn. Syst. Maint. and Mgt. facility
102	Squadron Operations/Comm
102	110/119th Squadron: AGE Shop/Corrosion Control/Air Cond./ Refrigeration
110	Avionics Shop
111	Upper Hangar: Fuel Syst., Electrical Shop, Pneudraulics Shop, Wheel and Tire Shop/Repair and Reclamation
113	Alert Hangar: Corrosion Control, Metal Processing, Machine Shop, Sheet Metal Shop, Periodic Maint. Dock
120	Fire Station
123	Petrol. Oper.
124	Sewage Treat. and Disp.
125	Water Pump Sta.
126	Shop: AGE, Engine Inspection and Repair
127	Sewage Treat. and Disp.
128	Oper. Stor.: Jet Fuel (Main POL)
130	Oper. Stor.: Diesel (Main POL)
131	Pump Sta.: Liquid Fuel (Main POL)
132	Pump Sta.: Liquid Fuel (Main POL)
133	Load/Unload Platform
134	Headquarters
135	Non-Destruction Inspection (NDI) Lab
140	Disaster Preparedness Building
150	Pump Sta.: Liquid Fuel (Intermediate POL)
200	PMEC Admin.
202	Academic Lecture Hall
204	Dining Hall
205	Dormitory, Visiting Airmen Qrtrs. (VAQ)
206	Dormitory, VAQ
207	Open Mess (Armed Forces Club)

TABLE IV.3 (CONTINUED)

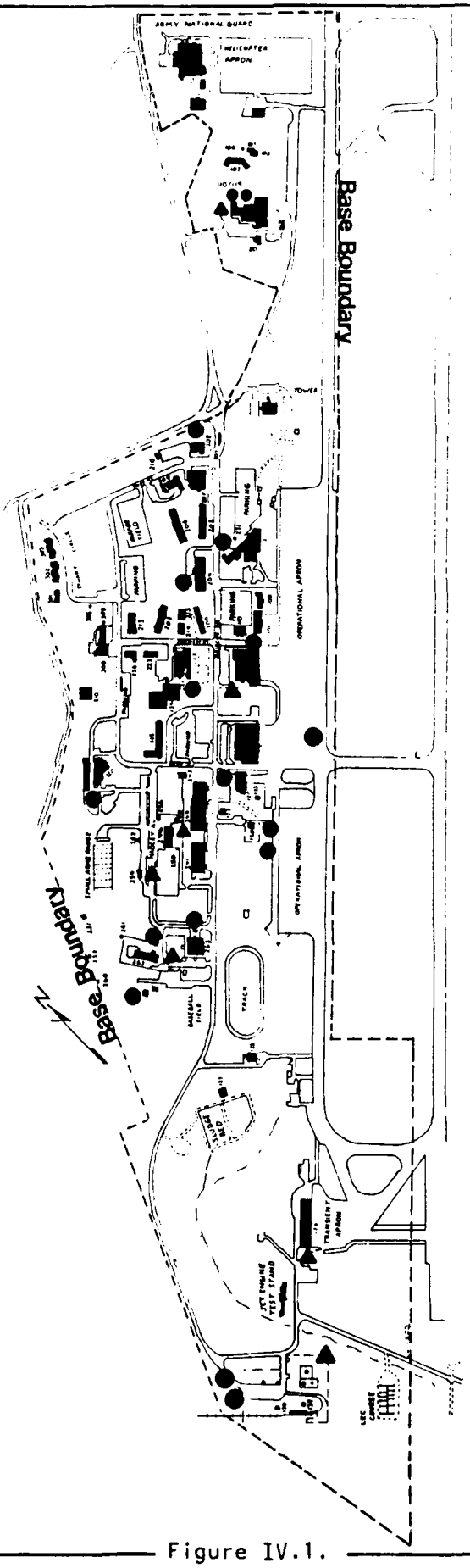
BLDG.	DESCRIPTION
208	Security Police Operations
209	Gym
210	Warehouse: Base Supply and Equipment
213	Theatre
214	Tech. Training Classroom
215	Library
221	Base Exchange
222	Academic Lecture Hall
223	Visiting Officer Qrtrs.
225	Visiting Officer Qrtrs.
226	Chapel
229	Incinerator
231	Ant. Spt. Structure
232	Aircom Radio Relay
240	Warehouse: Base Supply and Equip.
241	Warehouse: Mobility Supply and Equip.
243	Ammo Whse.
245	Hazardous Storage, Base
246	Vehicle maint. Shops (Motor Pool)
247	Entomology
248	Vehicle Service Rack
250	Vehicle Maint. Shop
251	Load/Unload Platform
252	Vehicle Fuel Sta.: Mogas
254	Shop: Refuel Vehicles
256	Vehicle Maint.
257	Load/Unload Platform
260	Incinerator Building
261	Hazardous Materials Storage, Base
262	228th AFCC Squadron: Vehicle Maint., A/SE Storage Facility
263	228th Communications/Radio Maint.
300	Clinic/Bioenvironmental Engineering
301	Family Housing, Single
302	Family Housing, Duplex
303	Family housing, Duplex

TABLE IV.3 (CONTINUED)

BLDG.	DESCRIPTION
305	Water Pump Sta.
307	Main Gate
308	Shed: Supply and Equipment
310	Water Tank Storage
320	Civil Engineering/Entomology
1799	Small Arms Range
2115	Jet Engine Test Stand
2120	Liquid Oxygen Storage
7508	Ballfield
7530	Tennis Courts
7539	Basketball Court
7540	Track

Source: McGhee-Tyson
ANGB Civil Engineering

Underground Storage Tanks (USTs Oil/
Water Separators McGhee-Tyson ANGB



LEGEND

Paved Roads/Parking Lots
Streams/Ditches
Property Line
Buildings
Underground Storage Tank UST
Oil/Water Separator
Railroads

SCALE
1"=785'

Figure IV.1.

Data for the above ground tanks are summarized in Table H.3. The main POL JP-4 storage tanks are located in a diked tank farm with state-of-the-art spill protection. Two small above ground JP-4 tanks are located in the 110th/119th area, Building 100.

B. Disposal/Spill Site Identification, Evaluation, and Hazard Assessment

Interviews with 30 Base personnel and subsequent site visits identified a total of eleven potential sites. Of this total, seven are potentially contaminated sites resulting from past Base actions. The seven potentially contaminated sites were rated by application of the USAF HARM (Appendix C). Each of these seven sites is recommended for further investigation. Copies of the completed HARM forms and an explanation of the factor rating criteria used for site scoring are contained in Appendix D. The remaining four (unrated) sites do not pose a threat to either human health or the environment and "No Further Action" is recommended. Locations for the seven rated and four unrated sites are provided on Figure IV.2.

The potential exists for contaminant migration at each of the 7 rated sites. Since the Base drainage is primarily underground, groundwater migration is the primary pathway for contaminant migration. With the shallow groundwater recharging the deeper Knox aquifer, potentially contaminated shallow groundwater would be a threat to receptors through groundwater discharge at resurgent springs. Sites 1-7 could be a threat to shallow groundwater if potentially hazardous released materials from each of these sites were to migrate downward into the shallow water table.

Surface water migration is only a mode of transport for migrating contaminants during periods of heavy precipitation in which surface water not absorbed in the shallow groundwater is transported off Base by flash flooding or excess surface water runoff. Sites No. 3, 4, and 7, which involve visible surface contaminants, and/or reported release into the storm drain, have potential to contaminate Base surface drainage and the Lackey Creek watershed during periods of precipitation.

Source: McGhee-Tyson ANGB
Civil Engineering

Proposed Sites McGhee-Tyson ANGB

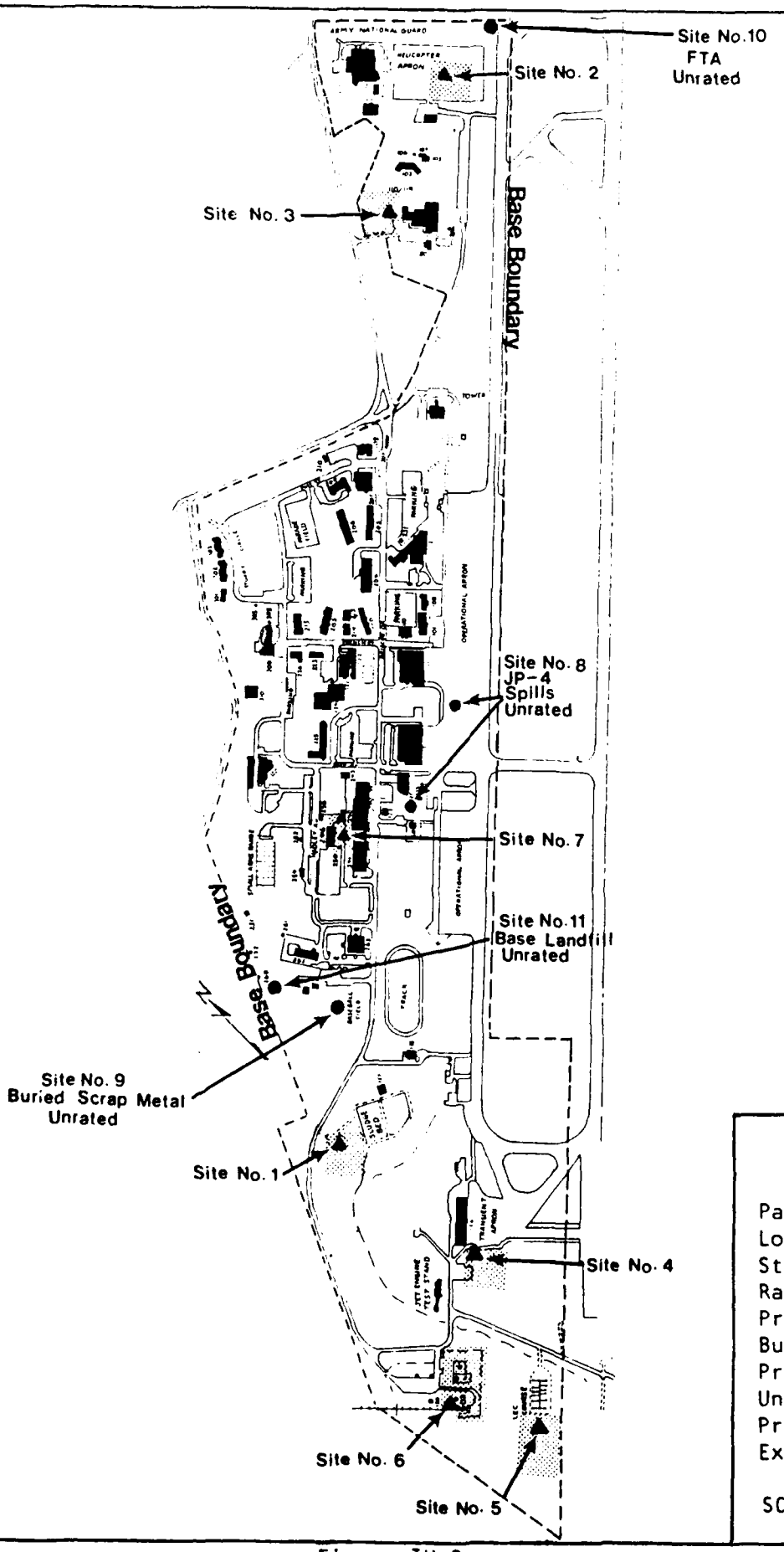


Figure IV.2.

The following sub-sections provide detailed descriptions of the rated and unrated sites.

Rated Sites:

Site No. 1 - Fire Training Area (FTA) at the Sewage Treatment Bed (HAS-67)

Base fire training exercises prior to 1985 were conducted primarily at two locations on Base property: (1) at the northwest corner of the present Base Sewage Treatment Plant (Site No. 1) and, (2) at the present Army National Guard Helicopter Parking Apron (Site No. 2). Site No. 1 location in relation to the Base Sewage Treatment Facility and other Base facilities is illustrated in Figure IV.2.

Base interviewees indicated that Site No. 1 was used for fire training exercises from 1957 to 1984. Base fire training exercises were conducted up to four times per year using up to 300 gallons per exercise. They also indicated that this site was used extensively from 1957-1968. The fuel mixture was primarily JP-4 with some waste oil and small amounts of cleaning solvents generated by Base facilities. This fuel mixture was ignited on a water curtain without an underlying retaining liner.

Site No. 1 was observed to be a circular area approximately 30 to 50 feet in diameter with a central concrete structure used as a burning aircraft simulator. An on-site visit revealed no stress vegetation or migrating surface contaminants.

Up to 20% of the JP-4 and liquid waste utilized during the exercises had potential to migrate downward and contaminate soil or groundwater. Although small volumes of pollutants could contaminate soil during individual fire training exercises a relatively large volume of pollutants had potential to accumulate in the soil overburden or shallow groundwater during the extended period of use.

Site No. 2 -Fire Training Area (FTA) at the Army National Guard Helicopter Parking Apron (HAS - 69)

Site No. 2 was used in addition to site No. 1 as a location for Base fire training exercises from 1968 to 1978. Site No. 2 in relation to the Helicopter Parking Apron and other Base facilities is illustrated in Figure IV.2. Like site No. 1, the fuel used during fire training exercises was primarily JP-4 along with some waste oil and small amounts of cleaning solvents generated by Base facilities. Base interviewees

indicated that site No. 2 was utilized up to four times per year and burned up to 300 gallons of fuel per exercise. These burns were made upon a water curtain without a retaining liner.

As a result of the construction of the Army Helicopter Parking Apron, visual observation of the original site No. 2 FTA was impossible. Interviews with Army Aviation personnel indicated that 6 to 8 feet of fill dirt was placed over the original site during the Helicopter Parking Apron construction. Visual observation of Base archive photographs illustrated a circular area possibly 50 feet in diameter which contained a small airplane used as a burning aircraft simulator.

Base archive photographs also illustrated several drums adjacent to the FTA possibly containing fuel to be burned during fire training exercises.

Like site No. 1, site No. 2 was assessed a HAS score because up to 20% of JP-4 fuel and liquid waste utilized during fire training exercises has potential to migrate downward and contaminate soil and/or shallow groundwater. Because of the relatively large volume of fuel utilized during each fire training exercise it is possible that surface pollutants have migrated into the soil overburden and shallow groundwater.

Site No. 3 - Oil/Water Separator at 110/119th TCF Vehicle Maintenance Area, Building 100 (HAS-56)

A release of liquid waste containing waste oil and small amounts of cleaning solvents occurred on the northwest side of Building 100 (110/119th TCF) in 1986, when the water outflow line from the oil/water (o/w) separator was apparently broken while a ditch was being excavated to bury a communication cable. The location and areal extent of site No. 3 in relation to Building 100 and other Base facilities is illustrated in Figure IV.2.

The liquid waste release was discovered when the o/w separator's 550 gallon waste oil holding tank was found to be empty during a routine check. A follow-up excavation by Base Civil Engineering found the sewer line to be broken and that oil had migrated along the outflow line about 60 feet from the o/w separator. Interviewees estimated that a minimum of 200 gallons of liquid waste were released before they had replaced the line.

In addition, during the on-site inspection, stress vegetation was observed about 100 feet downgradient from the separator overflow line. This area of stress vegetation was about 10 feet wide and 20 feet long. The stress vegetation was either the result of overflow or overloading of the o/w separator.

Site No. 3 was assessed a HAS score because of the migration of potential contaminants, as observed in the on-site stress vegetation, and the presence of liquid waste discovered when the effluent line was excavated.

The threat to potential receptors has been mitigated by replacement of the outflow line with new polyethylene pipe.

There is potential for liquid waste to migrate downward from the overflow pipe and potentially contaminate soil and/or shallow groundwater.

Site No. 4 - Oil/Water Separators at AGE Shop, Building 126 (HAS-56)

The source of potential contamination at site No. 4 is a past release of not more than 500 gallons of liquid waste containing waste oils and small amounts of cleaning solvents from twin oil/water (o/w) separators at the south corner of building No. 126 "AGE Shop". Both o/w separators share a common 550 gallon waste oil holding tank. Water discharges to a field bed 200 feet downgradient from the south corner of Building No. 126. The areal extent of Site No. 4 in relation to building No. 126 and other Base facilities is illustrated in Figure IV.2. An on-site inspection revealed two areas of liquid waste migration:

(1) The drainage swale directly adjacent to the o/w separators and

(2) The area adjacent to the field bed distribution boxes.

Liquid waste migration along the drainage swale directly adjacent to the o/w separators was observed to be an area of heavily oil-stained soil and stress vegetation (dead grass) approximately 4 feet wide and 20 feet long. The source of contaminant migration may be a past discharge from the o/w separator overflow line.

Liquid waste migration adjacent to the field bed distribution boxes was observed to be an area of heavily oil-stained soil and stressed vegetation 12 feet wide and 50 feet long. The soil adjacent to the distribution

boxes was more heavily oil-stained with a stronger petroleum odor than soil along the previously described drainage swale. This liquid waste release may have been the result of a leaking distribution box cover lid.

Interviewees indicated that both releases of liquid waste may be the result of a larger liquid volume inflow than was specified in the original o/w separator design. Additional inflow may be the result of surface water derived from the construction of additional asphalt pads and storm drains.

Site No. 4 was assessed a HAS score because of the release and migration of surface contaminants. There is potential for pollutants to migrate downward and contaminate the soil overburden and/or shallow groundwater.

Site No. 5 - Base Landfill Adjacent to Main POL Storage Facility (HAS-44)

A past Base landfill is located due south of the main POL storage facility. The areal location for site no. 5 in relation to the main POL and other Base facilities is illustrated in Figure IV.2. This Base landfill was used as a Base solid waste disposal site from 1956 to 1968. Solid waste items which were disposed of included general garbage, empty paint cans, used vehicle and aircraft parts, and used electrical wiring. Numerous Base interviewees indicated that liquid wastes including waste oil, solvents, toxic chemicals, etc. were not disposed of at this site.

Base interviewees estimated that the landfill areal extent was approximately 2 acres. Solid waste disposal procedures included the excavation of individual trenches approximately 12 feet wide, 40 feet long, and 6 feet deep. Solid waste, which was placed in these excavated trenches, was burned to reduce the overall waste volume. After the waste was burned, the excavated trench, containing burned solid waste residuals, was backfilled with previously excavated soil. No leachite or other lining agent was used to prevent the downward migration of potential contaminants.

The solid waste items which Base interviewees reported were disposed of at the landfill site do not pose a threat to human health or potential receptors. However, this site was assessed a HAS score because there are no documented waste disposal records and the site was used over a 12 year period. There is a possibility that unknown potentially hazardous materials were disposed of in this landfill that could cause a potential threat to receptors. If potential contaminants are leaching from

the buried landfill waste, there is a possibility that the soil overburden or shallow groundwater may become contaminated.

Site No. 6 - Main POL Facility (HAS 73)

Base interviewees reported the occurrence of three major past JP-4 spills at the main POL facility. The location of the main POL in relation to other Base facilities is illustrated in Figure IV.2. These past JP-4 spills were reported to have occurred in 1980, 1976, and the early 1960's.

In 1980, a 5,000 gallon JP-4 Tanker Truck waiting to unload into the Main POL storage tanks accidently overturned at the fuel loading railroad spur (see Figure IV.2) within the main POL facility. As a result of the accident, the tanker's entire contents (5000 gal of JP-4) was released into the environment. No absorbent or other remediation was initiated to retrieve any of the released JP-4 fuel. Also, a JP-4 spill from one of the main POL storage tanks occurred in 1976 in which 7000 gallons of JP-4 were released into the environment. This release occurred as a result of ice formation which caused the partial opening of a valve in the JP-4 storage tank piping system. Of the 7000 gallons of JP-4 released about 5000 gallons were recovered.

There are confirmed Base interviewee reports that a major JP-4 spill occurred in the early 1960's at one of the main POL storage tanks. The volume of JP-4 released into the environment was estimated to exceed 30,000 gallons. This spill occurred when a coupling in the water drain line from the floating roof froze and burst creating an opening at the bottom of the tank which caused the release of JP-4.

Interviewees indicated that the JP-4 release occurred over a 2 day period and was not immediately detected by Base personnel. When detected, the spill was reported to the Tennessee Valley Authority.

Site no. 6 was assessed a HAS score because of the large volume of unrecovered JP-4 in each of these spills. If the previous release of JP-4 has not since been removed by surface water or groundwater migration, the soil overburden or shallow groundwater at the main POL facility may be potentially contaminated.

Site No. 7 - Oil/Water Separator at Vehicle Maintenance, Building 246 (HAS-56)

There are confirmed reports of past liquid waste release of not more than 500 gallons containing waste oils and small amounts of cleaning solvents into the storm sewer drainage from the oil/water separator at the southeast side of Building 246, Vehicle Maintenance. The location for site No. 7 in relation to Building 246 and other Base facilities is illustrated in Figure IV.2. Base interviewees reported observing waste oil in the storm drain downgradient from Building 246. Base interviewees also indicated that past waste release from the oil/water separator may be the result of a larger liquid inflow to the o/w separator than originally designed for. This increased liquid volume is the result of additional asphalt and storm drains receiving surface runoff and the installation of a vehicle wash rack adjacent to the oil/water separator.

Observation of the oil/water separator at building 246 and the adjacent downgradient storm drain revealed no stress vegetation or liquid waste migration. However, oil staining and stressed vegetation were observed at the Base storm drain discharge indicating an upgradient release of potentially hazardous wastes.

The oil/water separator at Building No. 246 was assessed a HAS score because of the past unknown quantities of liquid waste which were released into the storm sewer drainage. The migrating released liquid waste could possibly contaminate surficial soil and shallow groundwater downgradient from the storm sewer discharge.

Unrated Sites:

Site No. 8 - JP-4 Spills at Aircraft Apron and Intermediate POL (Unrated)

Base interviewees reported the occurrence of several small JP-4 spills at the Aircraft Apron and Intermediate POL facility. The relatively small volume of released JP-4 was recovered by absorbent material or other spill remediation measures. Since the contaminant source has been removed, there is no potential threat to receptors from surface water or groundwater contamination. Therefore, these spill sites were not assessed a HAS score.

Site No. 9 - Buried Scrap Metal at the Baseball Field (Unrated)

The present baseball field was previously used as a holding area for salvage metal waste. It was reported by Base interviewees that two crashed aircraft along with scrap metal were buried at this site. Since metal waste in bulk form will not potentially contaminate soil, groundwater, or surface water there is no potential threat to receptors. As a result, this site was not assessed a HAS score.

Site No. 10 - Fire Training Area (FTA) Adjacent to Taxiway (Unrated)

It was reported by Base interviewees that the area directly adjacent to the northeast end of the Taxiway was used as a temporary facility for fire training exercises. The site location in relation to the taxiway and other Base facilities is illustrated in Figure IV.2. This fire training site was only used 2 to 4 times over a period of 1-2 years using 50 to 200 gallons of only JP-4 during each exercise. A volume of 15 to 20% of JP-4 fuel may have migrated into the soil overburden. With the limited and infrequent use, as reported by Base interviewees, and/or the relatively small volume of JP-4 migration, there is not significant potential for soil or shallow groundwater contamination at this site. Because it has no significant threat to receptors from potentially contaminated soil or shallow groundwater, this site was not assessed a HAS score.

Site No. 11 - Base Landfill Adjacent to Building 260 Incinerator (Unrated)

The area directly adjacent to the Base incinerator was previously used as a Base landfill during the mid 1960's. The site location in relation to Building 260 is illustrated in Figure IV.2. Base interviewees indicated that this site was a temporary facility with limited use as a solid waste disposal site. Base interviewees also reported that this site was not used for the disposal of toxic chemicals. With the limited use as a solid waste disposal site and no reported disposal of chemical waste, there is no potential threat to receptors from potentially contaminated soil or shallow groundwater. Therefore, this site was not assessed a HAS score.

C. Critical Habitats/Endangered or Threatened Species

There are no critical habitats either within or directly adjoining the Base boundaries. The Alcoa marsh, which contains Wetlands habitat, is located 4 miles southeast of the Base boundary. However, the Base surface drainage exit and groundwater movement, both of which migrate to the northwest, would not present an adverse effect upon the Wetlands ecosystem by the migration of potentially contaminated surface or groundwater.

A trout farm facility is presently located at the Profitt Spring resurgence which is a potential discharge for groundwater underlying the Base and immediate vicinity. Trout within this facility would be the immediate receptors to the discharge of potentially contaminated groundwater.

Correspondence with the Tennessee Department of Conservation Division of Ecological Services has revealed that there are no endangered or rare plant or animal species either within the boundaries or directly adjoining the Base boundaries. However, the Division of Ecological Services has documented the occurrences of certain endangered animal species within a 4 mile radius of the Base boundaries. These occurrences include the following species:

Hemitremia Flammea - Flame Chub
Myotis Grisesens - Gray Bat
Nycticorax Violaceus - Yellow Crown Night Heron
Fusconia Cuneolus - Fine Rayed Pig Toe Pearly Mussel
Tyto Alba - Barn Owl
Rallus Limicola - Virginia Rail

D. Other Pertinent Facts

- Sanitary sewage along with industrial water is treated on Base in a 50,000 gallon sewage treatment facility - septic tank with sand filtration and sludge drying bed. As shown in Appendix E, the facility operates in full compliance with state and federal regulations.

- ANG Regulation ANGR 19-7, 15 October 1985 and supplemental instructions issued since then outline the Base Environmental Pollution Monitoring Program. The Base water stream monitoring is also summarized in Appendix E.

- The Base Fire Department coordinates the Spill Response Program. During the past two years only one class III spill (i.e. an area over 10 feet in any plane dimension and over 50 square feet of area) has been recorded. A relatively small JP-4 spill was contained using absorbent material (with a flat pavement this spill would not have been class III).

- The current fire training exercises are conducted at the city of Knoxville Fire Department Training Center, using JP-4 as fuel.

- The dielectric fluids and oils from all Base transformers and compressors have been analyzed for possible PCB contamination. The 1983 analyses showed that nearly all fluids contained concentrations of PCB's less than 4 PPM (Please refer to Appendix F). Even so, all fluids from transformers and compressors were removed and disposed of by an independent contractor. This equipment can now be classified as non-PCB containing.

- The Base handles and utilizes certain pesticides, herbicides, and fertilizers (refer to Appendix G). Such materials are handled according to the U.S. Air Force Pest Management Program. Any resulting wastes are disposed of through a contractor.

- Natural gas is the primary fuel used to heat buildings. Fuel oil is the back-up fuel.

- A natural gas-fired incinerator is located at Building 260. This unit has a state air emissions operating permit and only operates a few hours each week burning classified documents.

- JP-4 spills at the main POL area have been mitigated by two major spill protection measures completed by 1987:

    1. The three above ground storage tanks are now housed in a concrete diked area which contains a concrete floor. This enclosure is adequate to contain any major spill. When trapped rainwater accumulates in the bottom, it is drawn off through an oil/water separator.

    2. These above ground tanks previously had only floating roofs which were exposed to and collected rainfall. Water freeze-up problems, in the past, resulted in some large JP-4 spills. In addition to floating roofs, all

tanks now also have fixed roofs. As a result, ice formation problems with the old design are eliminated.

- Trash and non-hazardous solid waste are currently disposed of by an outside contractor.

V. CONCLUSIONS

- Information obtained through interviews with Base personnel, review of records, and field observations, identified a total of 11 potential spill/disposal sites on Base property.

- Of this total, seven sites exhibit the potential contaminant migration through surface water and/or shallow groundwater, and, as such, require further investigation.

- The remaining four (unrated) sites pose no threat to either human health or the environment, and require "No Further Action".

VI. RECOMMENDATIONS

The Preliminary Assessment indicated that contamination exists or has potential to exist at seven of the 11 identified sites. A follow-up Site Investigation, for the seven rated sites (Site Nos. 1-7), is recommended to confirm whether contamination exists. If confirmed, field work should be initiated to quantify and determine the extent of contamination.

No further action is recommended for the four remaining unrated sites (Site Nos. 8-11). Decision Documents will be prepared, under separate cover, to support the decision to delete these four sites from further IRP consideration.

GLOSSARY OF TERMS

ANTICLINE - A fold in rocks that is convex upward or had such an attitude at stage of development.

AQUIFER - Stratum or zone below the surface of the earth capable of producing water as from a well.

AXIAL PLANE - A plane that intersects the crest or trough of a fold in such a manner that the limbs or sides are more or less symmetrically arranged with reference to it.

CONTAMINANT - As defined by Section 101 (33) of SARA shall include, but not be limited to any element, substance, compound, or mixture, including disease-causing agents, which after release into the environment and upon exposure. ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions (including malfunctions in reproduction), or physical deformations in such organisms or their offsprings, except that the term "contaminant" shall not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance under:

(a) any substance designated pursuant to Section 311(b)(2)(A) of the Federal Water Pollution Control Act,

(b) any element, compound, mixture, solution, or substance designated pursuant to Section 102 of this Act,

(c) any hazardous waste having the characteristics identified under or listed pursuant to Section 3001 of the Solid Waste Disposal Act (but not including any waste the regulation of which under the Solid Waste Disposal Act has been suspended by Act of Congress).

(d) any toxic pollutant listed under Section 307(a) of the Federal Water Pollution Control Act,

(e) any hazardous air pollutant listed under Section 112 of the Clean Air Act, and

(f) any imminently hazardous chemical substance or mixture with respect to which the Administrator has taken action pursuant to Section 7 of the Toxic Substance Control Act and shall not include natural gas of pipeline quality or mixtures of natural gas and such synthetic gas.

NOTE: Petroleum products are covered in other regulations. In the state of Tennessee wastes from petroleum products do not become RCRA hazardous wastes unless they fall under any of the USEPA guidelines for identifying Hazardous wastes:

(1) Listed hazardous wastes from certain specific and non-specific sources.

(2) Listed Acutely hazardous wastes.

(3) Listed wastes that contain materials and products based on the criteria for toxicity.

(4) Wastes that meet any of four characteristics of hazardous waste - i.e. ignitability, reactivity, corrosivity, and extraction procedure toxicity (EP toxicity).

CONTAMINATION - The existence of biological, radiological, chemical, or other substances which have been identified as or may present a hazard to health or may render some portion of the environment unsuitable for use.

CRITICAL HABITAT - As defined by the U.S. Department of Commerce and U.S. Department of Agriculture; the specific areas within the geographic range of a species that are essential for the preservation of that species and that may require special protection.

DOWNGRADIENT - Hydraulically downslope direction of groundwater flow.

ENDANGERED SPECIES - Plant or wildlife species designated as endangered by the U.S. Fish and Wildlife Service.

FAULT ZONE - A fault instead of a single fracture may be a zone hundreds even thousands of feet wide containing numerous interconnecting small faults.

FRACTURE - Breaks in rocks due to intense folding and faulting.

GROUNDWATER - That part of the subsurface water which is the zone of saturation.

HAZARD ASSESSMENT RATING METHODOLOGY (HARM) - A system adopted and used by the United States Air Force to develop and maintain a priority listing of potentially contaminated sites on installations and facilities for remedial action based on potential hazard to public health, and environmental impacts.

HAZARD ASSESSMENT SCORE (HAS)- The score developed by utilizing the Hazardous Assessment Rating Methodology.

HAZARDOUS WASTE - A solid or liquid waste that because of its quantity, concentration, or physical, chemical, or infectious characteristics may

(a) cause or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness, or

(b) pose a substantial present or potentially hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

INSTALLATION RESTORATION PROGRAM (IRP) - The DoD program for identifying the location of and releases of hazardous materials from past disposal sites and minimizing their associated hazards to public health.

LEACHITE - A lining agent installed to prevent the downward migration of contaminants as a leachite liner in a solid waste landfill to prevent the downward migration of leachate into the underlying soil or watertable.

LOAM - A soil composed of a mixture of clay, silt and organic matter.

MIGRATION - The movement of contaminants through pathways (groundwater, surface water, soil and air).

NATURAL AREA - Designated areas with critical habitat or endangered species protected from human exploitation by federal or state laws.

OROGENY - The process of forming mountains particularly by folding and thrust faulting.

PERMEABILITY - Capacity of a rock, soil or unconsolidated sediment to transmit a fluid over a given period of time.

PHYSIOGRAPHIC PROVINCE - Region of similar structure and climate that has had a unified geomorphic history.

PLUME - The three dimensional areal extent both vertical and horizontal of migrating contaminants; as in groundwater, the areal vertical and horizontal concentrations within an aquifier of migrating contaminants.

SURFACE WATER - Water exposed on ground surface, i.e., lakes, streams, rivers, etc.

SWALE - A low lying or depressed and often wet stretch of land.

SYNCLINE - A fold in rocks in which the strata dip inward from both sides of the axis.

TOXICITY - A relative property of a chemical agent and refers to a harmful effect on some biologic mechanism and the condition under which this effect occurs.

UPGRADIENT - A direction that is hydraulically upslope.

WATERTABLE - The upper limit of the portion of the ground wholly saturated with water.

WETLANDS - Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.

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14.) HMTC, 1987, Preliminary Assessment, 187 Tactical Fighter Group, Dannelley Field Municipal Airport, Montgomery, Alabama.

15.) PEER, 1988, Preliminary Assessment, 128th Tactical Fighter Wing, Wisconsin Air National Guard, Dane County Regional Airport/Truex field, Madison, Wisconsin.

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Appendix A
Resumes of Search Team Members

JACK DENTON WHEAT
Geologist/Hydrogeologist

EDUCATION

B.S. Geology - Tennessee Technological University

EXPERIENCE

Geologist/Hydrogeologist, Science & Technology, Inc.
1988 - Present

Preliminary assessment (PA) Phase I of the Department of Defense Installation Restoration Program (IRP). Primary contributions include the Geology and Hydrogeology of designated military installations and the susceptibility of principal ground water aquifers to contamination from surface pollutants. Also RCRA regulations were evaluated concerning the Department of Defense Hazard Assessment Rating Methodology (HARM).

Geological Assistant, Robert Stansfield Consulting Geologist
1987

Drilling and installation of monitor wells to further identify potential groundwater contaminants. Monitor wells were installed and developed at EPA superfund sites. OSHA and EPA regulations concerning safety work procedures and protection requirements were followed at EPA superfund sites. The EPA standards for post drilling decontamination of contaminated site equipment were also utilized at superfund sites.

Field Hydrogeologist, Oak Ridge National Laboratory (ORNL)
February 1987 - May 1987

Field Geologist for the Department of Energy, Bethel Valley Low Level Waste (LLW) pipeline project. Major geological functions included soil sample analysis for individual borings, soil sampling techniques, and the inspection of drilling procedures to follow specified regulations. Monitor wells were installed when necessary to evaluate ground water contamination. Individual LLW boring reports were compiled to include soil sample descriptions, zone of ground water saturations, levels of radioactive contamination, and the individual boring location. A monitor well schematic construction log was included with a monitor well installation. Additional functions at ORNL included assistance in obtaining the necessary required DOE documents, i.e., ADM ACDM, Safety Assessment, prior to project initiation. Also a work plan was compiled for ORNL Environmental Science Division concerning a test trench site to evaluate pipeline trench back fill. The areas of activity at ORNL included ORNL plant area and SWSA 6.

Consulting Geologist, Oil & Gas Industry
1980 - 1986

Consulting geologist for oil and gas companies with operations in Tennessee, Kentucky & Illinois. Major functions included wellsite geology and sample analysis of exploration drillsite cuttings. Drilling procedures, i.e.,grout surface casing, lined pits to retain drilling fluids, were supervised to follow state regulations regarding the contamination of surface streams or groundwater aquifers. Geologic reports were compiled to include stratigraphic formation lithology and oil or gas potential payzones, and geologic maps, i.e., structure contours, insopachs, to pinpoint the desired location to drill. Oil and gas well location maps were drafted for map sales and assistance in drawing geologic maps.

Geologist, Petroleum Development Corporation
1977 -1980

Geological Functions at Petroleum Development were quite similar to the previously described consulting geologist. Geological duties at Petroleum Development were predominately Field Geology, i.e., sample analysis, drilling supervision, etc., with only few assignments in geological reports, subsurface mappings, etc. Well location maps were down for assistance in exploration oil or gas programs.

HAZARDOUS WASTE TRAINING

Seminars were conducted at ORNL, February 1987 on the types of radioactive nuclides, i.e., Alpha Beta, Gamma, and the transmitters of radioactive contaminants. The training and qualification for respirator usage was also conducted at ONRL. OSHA Safety Standards were issued at EPA Superfund sites.

GEOLOGICAL REGISTRATION

Presently, I have been approved as a licensed professional geologist for the State of North Carolina.

JAMES E. HUNT
Senior Chemical Engineer

EDUCATION

B.S. Chemical Engineering - Bucknell University
M.S. Chemical Engineering - Iowa State University

EXPERIENCE

Chemical Engineer, Science & Technology, Inc.
1988 - Present

Team member of the USAF Installation Restoration Program (IRP) Preliminary Assessment (PA). Virginia Air National Guard, Byrd International Airport, Richmond, Virginia.

Senior Chemical Engineer, Tennessee Eastman Company
1978 - 1987

In charge of Acid Division Clean Environment Program, Chemical and Environmental Engineer. Waste Minimization, Air Emission Control, Cleanwater Regulatory Activity, Toxic and Hazard Waste Management, Process Optimization for Waste Minimization.

Senior Chemical Engineer, Tennessee Eastman Company
1974 - 1978

Project Manager for major capital expansion for chemical manufacture. Supervisor chemical pilot plant operations and development work.

Senior Chemical Engineer, Tennessee Eastman Company
1973 - 1974

Project Engineer for several major capital projects in company's Central Engineering Division. Project Engineer for capital project working with outside contracting engineering firm.

Senior Chemical Engineer, Tennessee Eastman Company
1964 - 1973

Operating chemical division process improvement work, in charge of several large chemical operating manufacturing departments.

Chemical Engineer, Tennessee Eastman Company
1958 - 1964

Chemical engineering with pilot plant and high pressure operations

Grad Assistant, Instructor Chemical Engineering Department, Iowa State University
1955 - 1958

Chemical Engineer, Naugatuck Chemical (Uniroyal)
1953 - 1955

Supervisor of Polymerization Pilot Plant

Chemical Engineer, Koppers Co., Inc.
1951 - 1953

Pilot plant engineering and development work.

PROFESSIONAL MEMBERSHIP

American Institute of Chemical Engineers
Alpha Chi Sigma
Phi Lambda Upsilon

RAY S CLARK
Civil/Environmental Engineer

EDUCATION

B.S. Civil Engineering - Univerity of Tennessee, Knoxville, Environmental Engineering Emphasis

Graduate Courses Environmental Engineering, University of Tennessee

RCRA/CERCLA Seminar - Treatment Alternatives for Hazardous Waste

EXPERIENCE

Civil/Environmental Engineer, Science & Technology, Inc., Oak Ridge, Tennessee 1988 - Present

Team member of the USAF Installation Restoration Program (IRP) Preliminary Assessment, Tennessee Air National Guard, McGhee Tyson Airport, Knoxville, Tennessee.

Technician - Clark Drilling Services, Knoxville, TN 1980-1988

On-site inspection of monitoring wells. Installation and Development of monitoring wells - Drillers Helper.

PROFESSIONAL MEMBERSHIP

American Society of Civil Engineers

Appendix B
Outside Agency Contact List

OUTSIDE AGENCIES CONTACTED

(1) Maryville Chamber of Commerce
3095 Washington St.
Maryville, TN 37801 (615) 983-2241

(2) Tennessee Department of Health and Environment
Division of Groundwater Protection
305 Springdale NW
Knoxville, TN 37917 (615) 594-6035

(3) Tennessee Department Conservation
Ecological Services Division
701 Broadway
Nashville, TN 37219 (615) 742-6545

(4) Tennessee Department Conservation
Geology Division
701 Broadway
Nashville, TN 37219 (615) 742-6689

(5) Tennessee Department of Health and Environment
Division of Groundwater Protection
Terra Bld., 5th Floor
150 Ninth Avenue South
Nashville, TN 37219-5404 (615) 741-0690

(6) Blount County USDA Soil Conservation Service
211 Federal Bld.
Maryville, TN 37801 (615) 983-2011

(7) Blount County Planning Commission
Rm. G-12 Courthouse Annex
Maryville, TN 37801 (615) 546-7053

(8) United States Geological Survey
Water Services Division
1013 N. Broadway
Knoxville, TN 37917 (615) 521-8909

(9) GeoTek Engineering Company
8321 Oak Ridge Highway
Knoxville, TN 37931 (615) 690-0128

Appendix C
USAF Hazard Assessment
Rating Methodology

USAF HAZARD ASSESSMENT RATING METHODOLOGY

The Department of Defense (DoD) has developed a comprehensive program to identify, evaluate, and control hazardous waste disposal practices associated with past waste disposal techniques at DoD facilities. One of the actions required under this program is to:

> Develop and maintain a priority listing of contaminated installations and facilities for remedial action based on potential hazard to public health, welfare, and environmental impacts (Reference: DEQPPM 81-5, 11 December 1981).

Accordingly, the U.S. Air Force has sought to establish a system to set priorities for taking further action at sites based upon information gathered during the Preliminary Assessment phase of the Installation Restoration Program.

PURPOSE

The purpose of the site rating model is to assign a ranking to each site where there is suspected contamination from hazardous substances. This model will assist The National Guard in setting priorities for follow-up site investigations.

This rating system is used only after it has been determined that (1) potential for contamination exists (hazard waste present in sufficient quantity), and (2) potential for migration exists. A site may be deleted from ranking consideration on either basis.

DESCRIPTION OF THE MODEL

Like the other hazardous waste site ranking models, the U.S. Air Forces site rating model uses a scoring system to rank sites for priority attention. However, in developing this model, the designers incorporated some special features to meet specific DoD needs.

The model uses data readily obtained during the Preliminary Assessment portion of the IRP. Scoring judgment and computations are easily made. In assessing the hazards at a given site, the model develops a score based on the most likely routes of contamination and worst hazards at the site. Sites are given low scores only if there are clearly no hazards. This approach meshes well with the policy for evaluating and setting restrictions on excess DoD properties.

Site scores are developed using the appropriate ranking factors presented in Figure I.1 of this document. The site rating form and the rating factor guidelines are provided at the end of this appendix.

As with the previous model, this model considers four aspects of the hazard posed by a specific site: (1) possible receptors of the contamination, (2) the waste and its characteristics, (3) the potential pathways for contamination migration, and (4) any effort that was made to contain the waste resulting from a spill.

The receptors category rating is based on four rating factors: (1) the potential for human exposure to the site, (2) the potential for human ingestion of contaminants should underlying aquifers be polluted, (3) the current and anticipated use of the surrounding area, and (4) the potential for adverse effects upon important biological resources and fragile natural settings. The potential for human exposure is evaluated on the basis of the total population within 1000 feet of the site, and the distance between the site and the base boundary. The potential for human ingestion of contaminants is based on the distance between the site and the nearest well, the groundwater use of the uppermost aquifer, and population served by the groundwater supply within 3 miles of the site. The uses of the surrounding area are determined by the zoning within a 1-mile radius. Determination of whether or not critical environments exist within a 1-mile radius of the site predicts the potential for adverse effects from the site upon important biological resources and fragile natural settings. Each rating factor is numerically evaluated (0-3) and increased by a multiplier. The maximum possible score is also computed. The factor score and maximum possible scores are totaled, and the receptors subscore computed as follows: receptors subscore = (100 X factor subtotal/maximum score subtotal).

The waste characteristics category is scored in three steps. First, a point rating is assigned based on an assessment of the waste quantity and the hazard (worst case) associated with the site. The level of confidence in the information is also factored into the assessment. Next, the score is multiplied by a waste persistence factor, which acts to reduce the score if the waste is not very persistent. Finally, the score is further modified by the physical state of the waste. Liquid wastes receive the maximum score while scores for solids are reduced.

The pathways category rating is based on evidence of contaminant migration along one of three pathways: surface water migration, flooding, and groundwater migration. If evidence of contaminant migration exists, the category is given a subscore of 80 to 100 points. For indirect evidence, 80 points are assigned, and for direct evidence, 100 points are assigned. If no evidence is found, the highest score among the three possible routes is used. The three pathways are evaluated and the highest score among all four of the potential scores is used.

The scores for each of the three categories are added together and normalized to a maximum possible score of 100. Then the waste management practice category is scored. Scores for sites with no containment are not reduced. Scores for sites with limited containment can be reduced by 5 percent. If a site is contained and well-managed, its score can be reduced by 90 percent. The final site score is calculated by applying the waste management practices category factor to the sum of the score for the other three categories.

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE _____

LOCATION _____

DATE OF OPERATION OR OCCURRENCE _____

OWNER/OPERATOR _____

COMMENTS/DESCRIPTION _____

SITE RATED BY _____

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 ft. of site		4		
B. Distance to nearest well		10		
C. Land use/zoning within 1 mile radius		3		
D. Distance to installation boundary		6		
E. Critical environments within 1 mile radius of site		10		
F. Water quality of nearest surface water body		6		
G. Groundwater use of uppermost aquifer		9		
H. Population served by surface water supply within 3 miles downstream of site		6		
I. Population served by groundwater supply within 3 miles of site		6		

Subtotals _____ _____

Receptors subscore (100 x factor score subtotal/maximum score subtotal) _____

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) _____
2. Confidence level (C = confirmed, S = suspected) _____
3. Hazard rating (H = high, M = medium, L = low) _____

Factor Subscore A (from 20 to 100 based on factor score matrix) _____

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

_____ x _____ = _____

C. Apply physical state multiplier
Subscore B x Physical State Multiplier = Waste Characteristics Subscore

_____ x _____ = _____

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore _____

B. Rate the migration potential for 3 potential pathways: Surface water migration, flooding, and groundwater migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water		8		
Net precipitation		6		
Surface erosion		8		
Surface permeability		6		
Rainfall intensity		8		

Subtotals _____ _____

Subscore (100 x factor score subtotal/maximum score subtotal) _____

2. Flooding | | 1 | | |

Subscore (100 x factor score/3) _____

3. Groundwater migration

Depth to groundwater		8		
Net precipitation		6		
Soil permeability		8		
Subsurface flows		8		
Direct access to groundwater		8		

Subtotals _____ _____

Subscore (100 x factor score subtotal/maximum score subtotal) _____

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore _____

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors _____
Waste Characteristics _____
Pathways _____

Total _____ divided by 3 = _____
Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

_____ x _____ = _____

I. RECEPTORS CATEGORY

Rating Factors		Rating Scale Levels 0	1	2	3	Multiplier
A.	Population within 1,000 feet (includes on-base facilities)	0	1-25	26-100	Greater than 100	4
B.	Distance to nearest water well	Greater than 3 miles	1 to 3 miles	3,001 feet to 1 mile	0 to 3,000 feet	10
C.	Land use/zoning (within 1-mile radius)	Completely remote (zoning not applicable)	Agricultural	Commercial or Industrial	Residential	3
D.	Distance to installation boundary	Greater than 2 miles	1 to 2 miles	1,001 feet to 1 mile	0 to 1,000 feet	6
E.	Critical environments (within 1-mile radius)	Not a critical environment	Natural areas	Pristine natural areas; minor wetlands; preserved areas; presence of economically important natural resources susceptible to contamination	Major habitat of an endangered or threatened species; presence of recharge area; major wetlands	10
F.	Water quality/use designation of nearest surface water body	Agricultural or industrial use	Recreation, propagation and management of fish and wildlife	Shellfish propagation and harvesting	Potable water supplies	6
G.	Groundwater use of uppermost aquifer	Not used, other sources readily available	Commercial industrial, or irrigation, very limited other water sources	Drinking water, municipal water available	Drinking water, no municipal water available, commercial, industrial, or irrigation; no other water source available	9
H.	Population served by surface water supplies within 3 miles downstream of site	0	1-15	51-1,000	Greater than 1,000	6
I.	Population served by aquifer supplies within 3 miles of site	0	1-50	51-1,000	Greater than 1,000	6

II. WASTE CHARACTERISTICS

A-1 Hazardous Waste Quantity

S = Small quantity (5 tons or 20 drums of liquid)
M = Moderate quantity (5 to 20 tons or 21 to 85 drums of liquid)
L = Large quantity (20 tons or 85 drums of liquid)

A-2 Confidence Level of Information

C = Confirmed confidence level (minimum criteria below)

- o Verbal reports from interviewer (at least 2) or written information from the records
- o Knowledge of types and quantities of wastes generated by shops and other areas on base

S = Suspected confidence level

- o No verbal reports or conflicting verbal reports and no written information from the records
- o Logic based on a knowledge of the types and quantities of hazardous wastes generated at the base, and a history of past waste disposal practices indicate that these wastes were disposed of at a site

A-3 Hazard Rating

Rating Factors	Rating Scale Levels			
	0	1	2	3
Toxicity	Sax's Level 0	Sax's Level 1	Sax's Level 2	Sax's Level 3
Ignitability	Flash point greater than 200°F	Flash point at 140°F to 200°F	Flash point at 80°F to 140°F	Flash point less than 80°F
Radioactivity	At or below background levels	1 to 3 times background levels	3 to 5 times background levels	Over 5 times background levels

Use the highest individual rating based on toxicity, ignitability, and radioactivity and determine the hazard rating.

Hazard Rating	Points
High (H)	3
Medium (M)	2
Low (L)	1

II. WASTE CHARACTERISTICS--Continued

Waste Characteristics Matrix

Point Rating	Hazardous Waste Quantity	Confidence Level of Information	Hazard Rating
100	L	C	H
	L	C	M
80	M	C	H
70	L	S	H
	S	C	H
60	M	C	M
	L	S	M
	L	C	L
50	M	S	H
	S	C	M
	S	S	H
	M	S	M
40	M	C	L
	L	S	L
	S	C	L
30	M	S	L
	S	S	M
20	S	S	L

Notes:
For a site with more than one hazardous waste, the waste quantities may be added using the following rules:

Confidence Level

- Confirmed confidence levels (C) can be added.
- Suspected confidence levels (S) can be added.
- Confirmed confidence levels cannot be added with suspected confidence levels.

Waste Hazard Rating

- Wastes with the same hazard rating can be added.
- Wastes with different hazard ratings can only be added in a downgrade mode, e.g., MCM + SCH = LCM if the total quantity is greater than 20 tons.

Example: Several wastes may be present at a site, each having an MCM designation (60 points). By adding the quantities of each waste, the designation may change to LCM (80 points). In this case, the correct point rating for the waste is 80.

B. Persistence Multiplier for Point Rating

Persistence Criteria	Multiply Point Rating From Part A by the Following
Metals, polycyclic compounds, and halogenated hydrocarbons	1.0
Substituted and other ring compounds	0.9
Straight chain hydrocarbons	0.8
Easily biodegradable compounds	0.4

C. Physical State Multiplier

Physical state	Multiply Point Total From Parts A and B by the Following
Liquid	1.0
Sludge	0.75
Solid	0.50

III. PATHWAYS CATEGORY

A. Evidence of Contamination

Direct evidence is obtained from laboratory analyses of hazardous contaminants present above natural background levels in surface water, groundwater, or air. Evidence should confirm that the source of contamination is the site being evaluated.

Indirect evidence might be from visual observation (i.e., leachate), vegetation stress, sludge deposits, presence of taste and odors in drinking water, or reported discharges that cannot be directly confirmed as resulting from the site, but the site is greatly suspected of being a source of contamination.

B-1 Potential for Surface Water Contamination

Rating Factors	0	1	2	3	Multiplier
Distance to nearest surface water (includes drainage ditches and storm sewers)	Greater than 1 mile	2,001 feet to a mile	501 feet to 2,000 feet	0 to 500 feet	8
Net precipitation	Less than -10 inches	-10 to +5 inches	+5 to +20 inches	Greater than +20 inches	6
Surface erosion	None	Slight	Moderate	Severe	8
Surface permeability	0% to 15% clay ($>10^{-2}$ cm/sec)	15% to 30% clay (10^{-2} to 10^{-4} cm/sec)	30% to 50% clay (10^{-4} to 10^{-6} cm/sec)	Greater than 50% clay ($>10^{-6}$ cm/sec)	6
Rainfall intensity based on 1-year, 24 hour rainfall (thunderstorms)	<1.0 inch 0-5 0	1.0 to 2.0 inches 6-35 30	2.1 to 3.0 inches 36-49 60	>3.0 inches >50 100	8

B-2 Potential for Flooding

Floodplain	Beyond 100-year floodplain	In 100-year floodplain	In 10-year floodplain	Floods annually	1

B-3 Potential for Groundwater Contamination

Depth to groundwater	Greater than 500 feet	50 to 500 feet	11 to 50 feet	0 to 10 feet	8
Net precipitation	Less than -10 inches	-10 to +5 inches	+5 to +20 inches	Greater than +20 inches	6
Soil permeability	Greater than 50% clay ($>10^{-6}$ cm/sec)	30% to 50% clay (10^{-4} to 10^{-6} cm/sec)	15% to 30% clay 10^{-2} to 10^{-4} cm/sec	0% to 15% clay ($<10^{-2}$ cm/sec)	8
Subsurface flows	Bottom of site greater than 5 feet above high groundwater level	Bottom of site occasionally submerged	Bottom of site frequently submerged	Bottom of site located below mean groundwater level	8
Direct access to groundwater (through faults, fractures, faulty well casings, subsidence, fissures, etc.)	No evidence of risk	Low risk	Moderate risk	High risk	8

IV. WASTE MANAGEMENT PRACTICES CATEGORY

A. This category adjusts the total risk as determined from the receptors, pathways, and waste characteristics categories for waste management practices and engineering controls designed to reduce this risk. The total risk is determined by first averaging the receptors, pathways, and waste characteristics subscores.

B. Waste Management Practices Factor

The following multipliers are then applied to the total risk points (from A):

Waste Management Practice	Multiplier
No containment	1.0
Limited containment	0.95
Fully contained and in full compliance	0.10

Guidelines for fully contained:

Landfills:

- o Clay cap or other impermeable cover
- o Leachate collection system
- o Liners in good condition
- o Adequate monitoring wells

Surface Impoundments:

- o Liners in good condition
- o Sound dikes and adequate freeboard
- o Adequate monitoring wells

Spills:

- o Quick spill cleanup action taken
- o Contaminated soil removed
- o Soil and/or water samples confirm total cleanup of the spill

Fire Protection Training Areas:

- o Concrete surface and berms
- o Oil/water separator for pretreatment of runoff
- o Effluent from oil/water separator to treatment plant

General Note: If data are not available or known to be complete the factor ratings under items I-A through I, III-B-1, or III-6-3, then leave blank for calculation of factor score and maximum possible score.

Appendix D
Site Hazardous Assessment Rating Forms and Factor Rating Criteria

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE FTA at Sewage Treatment Bed - Site No. 1

LOCATION Adjacent to TN ANG Sewer Bed - Site No. 1

DATE OF OPERATION OR OCCURRENCE 1957 to 1984

OWNER/OPERATOR TN ANG

COMMENTS/DESCRIPTION Area for Fire Training Exercise

SITE RATED BY Science & Technology, Inc.

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 ft. of site	3	4	12	12
B. Distance to nearest well	2	10	20	30
C. Land use/zoning within 1 mile radius	3	3	9	9
D. Distance to installation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	0	10	0	30
F. Water quality of nearest surface water body	1	6	6	18
G. Groundwater use of uppermost aquifer	1	9	9	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by groundwater supply within 3 miles of site	2	6	12	18
		Subtotals	86	180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 48

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

80 x 0.9 = 72

C. Apply physical state multiplier
Subscore B x Physical State Multiplier = Waste Characteristics Subscore

72 x 1.0 = 72

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore _____

B. Rate the migration potential for 3 potential pathways: Surface water migration, flooding, and groundwater migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	3	8	24	24
Net precipitation	3	6	18	18
Surface erosion	2	8	16	24
Surface permeability	2	6	18	18
Rainfall intensity	2	8	16	24
		Subtotals	86	108

Subscore (100 x factor score subtotal/maximum score subtotal) 80

2. Flooding | 1 | 1 | 1 | 3

Subscore (100 x factor score/3) 33

3. Groundwater migration

Depth to groundwater	2	8	16	24
Net precipitation	3	6	18	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to groundwater	2	8	16	24
		Subtotals	58	114

Subscore (100 x factor score subtotal/maximum score subtotal) 51

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	48
Waste Characteristics	72
Pathways	80
Total 200 divided by 3 =	67
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

67 x 1 = 67

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE FTA at Army National Guard Helicopter Apron - Site No. 2

LOCATION Army Helicopter Apron - Site No. 2

DATE OF OPERATION OR OCCURRENCE 1968 to 1984

OWNER/OPERATOR TN ANG

COMMENTS/DESCRIPTION Area for Fire Training Exercise

SITE RATED BY Science & Technology, In.

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 ft. of site	3	4	12	12
B. Distance to nearest well	2	10	20	30
C. Land use/zoning within 1 mile radius	3	3	9	9
D. Distance to installation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	0	10	0	30
F. Water quality of nearest surface water body	1	6	6	18
G. Groundwater use of uppermost aquifer	1	9	9	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by groundwater supply within 3 miles of site	2	6	12	18
Subtotals			86	180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 48

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 100

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

100 x 0.9 = 90

C. Apply physical state multiplier
Subscore B x Physical State Multiplier = Waste Characteristirs Subscore

90 x 1 = 90

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore _____

B. Rate the migration potential for 3 potential pathways: Surface water migration, flooding, and groundwater migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	3	8	24	24
Net precipitation	3	6	18	18
Surface erosion	2	8	16	24
Surface permeability	2	6	12	18
Rainfall intensity	2	8	16	24
		Subtotals	86	108
Subscore (100 x factor score subtotal/maximum score subtotal)				80

2. Flooding | 1 | 1 | 1 | 3

Subscore (100 x factor score/3) 33

3. Groundwater migration

Depth to groundwater	2	8	16	24
Net precipitation	3	6	18	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to groundwater	2	8	16	24
		Subtotals	58	114
Subscore (100 x factor score subtotal/maximum score subtotal)				51

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	48
Waste Characteristics	90
Pathways	80
Total 218 divided by 3 =	73
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

73 x 0.95 = 69

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE Oil Water Separator - Site No. 3

LOCATION 110/119 Bldg. 100

DATE OF OPERATION OR OCCURRENCE 1986

OWNER/OPERATOR TN ANG "110/119"

COMMENTS/DESCRIPTION

SITE RATED BY Science & Technology, Inc.

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 ft. of site	3	4	12	12
B. Distance to nearest well	2	10	20	30
C. Land use/zoning within 1 mile radius	3	3	9	9
D. Distance to installation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	0	10	0	30
F. Water quality of nearest surface water body	1	6	6	18
G. Groundwater use of uppermost aquifer	1	9	9	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by groundwater supply within 3 miles of site	2	6	12	18
Subtotals			86	180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 48

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

50 x 0.8 = 40

C. Apply physical state multiplier
Subscore B x Physical State Multiplier = Waste Characteristics Subscore

40 x 1 = 40

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 80

B. Rate the migration potential for 3 potential pathways: Surface water migration, flooding, and groundwater migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	2	8	16	24
Net precipitation	3	6	18	18
Surface erosion	2	8	16	24
Surface permeability	2	6	12	18
Rainfall intensity	2	8	16	24
		Subtotals	78	108

Subscore (100 x factor score subtotal/maximum score subtotal) 72

2. Flooding | 1 | 1 | 1 | 3

Subscore (100 x factor score/3) 33

3. Groundwater migration

Depth to groundwater	2	8	16	24
Net precipitation	3	6	18	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to groundwater	2	8	16	24
		Subtotals	58	114

Subscore (100 x factor score subtotal/maximum score subtotal) 51

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	48
Waste Characteristics	40
Pathways	80
Total 168 divided by 3 =	56
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = final Score

56 x 1 = 56

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE Oil Water Separator - Site No. 4

LOCATION AGE Shop Bldg. 126

DATE OF OPERATION OR OCCURRENCE

OWNER/OPERATOR TN ANG 134th Air Refueling Group

COMMENTS/DESCRIPTION

SITE RATED BY Science & Technology, Inc.

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 ft. of site	3	4	12	12
B. Distance to nearest well	2	10	20	30
C. Land use/zoning within 1 mile radius	3	3	9	9
D. Distance to installation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	0	10	0	30
F. Water quality of nearest surface water body	1	6	6	18
G. Groundwater use of uppermost aquifer	1	9	9	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by groundwater supply within 3 miles of site	2	6	12	18

Subtotals 86 180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 48

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

50 x 0.8 = 40

C. Apply physical state multiplier
Subscore B x Physical State Multiplier = Waste Characteristics Subscore

40 x 1 = 40

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 80

B. Rate the migration potential for 3 potential pathways: Surface water migration, flooding, and groundwater migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	3	8	24	24
Net precipitation	3	6	18	18
Surface erosion	2	8	16	24
Surface permeability	2	6	12	18
Rainfall intensity	2	8	16	24
		Subtotals	86	108
Subscore (100 x factor score subtotal/maximum score subtotal)				80

2. Flooding

Flooding	1	1	1	3
Subscore (100 x factor score/3)				33

3. Groundwater migration

Depth to groundwater	2	8	16	24
Net precipitation	3	6	18	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to groundwater	2	8	16	24
		Subtotals	58	114
Subscore (100 x factor score subtotal/maximum score subtotal)				51

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	48
Waste Characteristics	40
Pathways	80
Total 168 divided by 3 =	56
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

56 x 1 = 56

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE Base Landfill - Site No. 5

LOCATION Adjacent to Main POL

DATE OF OPERATION OR OCCURRENCE 1957 to 1967

OWNER/OPERATOR TN ANG

COMMENTS/DESCRIPTION Base Landfill used as Solid Waste Disposal

SITE RATED BY Science & Technology, Inc.

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 ft. of site	3	4	12	12
B. Distance to nearest well	2	10	20	30
C. Land use/zoning within 1 mile radius	3	3	9	9
D. Distance to installation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	0	10	0	30
F. Water quality of nearest surface water body	1	6	6	18
G. Groundwater use of uppermost aquifer	1	9	9	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by groundwater supply within 3 miles of site	2	6	12	18
Subtotals			86	180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 48

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) L

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

50 x 0.4 = 20

C. Apply physical state multiplier
Subscore B x Physical State Multiplier = Waste Characteristics Subscore

20 x 0.5 = 10

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore ____

B. Rate the migration potential for 3 potential pathways: Surface water migration, flooding, and groundwater migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	3	8	24	24
Net precipitation	3	6	18	18
Surface erosion	2	8	16	24
Surface permeability	2	6	12	18
Rainfall intensity	2	8	16	24
		Subtotals	86	108
Subscore (100 x factor score subtotal/maximum score subtotal)				80

2. Flooding | 1 | 1 | 1 | 3

Subscore (100 x factor score/3) 80

3. Groundwater migration

Depth to groundwater	2	8	16	24
Net precipitation	3	6	18	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to groundwater	1	8	8	24
		Subtotals	50	114
Subscore (100 x factor score subtotal/maximum score subtotal)				44

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	48
Waste Characteristics	10
Pathways	80
Total 138 divided by 3 =	46
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

46 x 0.95 = 44

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE JP-4 Spills Main POL - Site No. 6

LOCATION Main POL facility

DATE OF OPERATION OR OCCURRENCE 1963, 1976, 1980

OWNER/OPERATOR TN ANG 134th Air Refueling Group

COMMENTS/DESCRIPTION

SITE RATED BY Science & Technology, Inc.

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 ft. of site	3	4	12	12
B. Distance to nearest well	2	10	20	30
C. Land use/zoning within 1 mile radius	3	3	9	9
D. Distance to installation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	0	10	0	30
F. Water quality of nearest surface water body	1	6	6	18
G. Groundwater use of uppermost aquifer	1	9	9	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by groundwater supply within 3 miles of site	2	6	12	18
Subtotals			86	180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 48

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 100

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

100 x 0.9 = 90

C. Apply physical state multiplier
Subscore B x Physical State Multiplier = Waste Characteristics Subscore

90 x 1 = 90

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore _____

B. Rate the migration potential for 3 potential pathways: Surface water migration, flooding, and groundwater migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	3	8	24	24
Net precipitation	3	6	18	18
Surface erosion	2	8	16	24
Surface permeability	2	6	12	18
Rainfall intensity	2	8	16	24
		Subtotals	86	108
				80

Subscore (100 x factor score subtotal/maximum score subtotal)

2. Flooding | 1 | 1 | 1 | 3

Subscore (100 x factor score/3) 33

3. Groundwater migration

Depth to groundwater	2	8	16	24
Net precipitation	3	6	18	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to groundwater	2	8	16	24
		Subtotals	58	114
				51

Subscore (100 x factor score subtotal/maximum score subtotal)

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	48
Waste Characteristics	90
Pathways	80
Total 218 divided by 3 =	73
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

73 x 1 = 73

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE Oil - Water Separator - Site No. 7

LOCATION Vehicle Maintenance Bldg. 246

DATE OF OPERATION OR OCCURRENCE

OWNER/OPERATOR TN ANG 134th Air Refueling Group

COMMENTS/DESCRIPTION

SITE RATED BY Science & Technology, Inc.

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 ft. of site	3	4	12	12
B. Distance to nearest well	2	10	20	30
C. Land use/zoning within 1 mile radius	3	3	9	9
D. Distance to installation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	0	10	0	30
F. Water quality of nearest surface water body	1	6	6	18
G. Groundwater use of uppermost aquifer	1	9	9	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by groundwater supply within 3 miles of site	2	6	12	18
Subtotals			86	180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 48

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

50 x 0.8 = 40

C. Apply physical state multiplier
Subscore B x Physical State Multiplier = Waste Characteristics Subscore

40 x 1 = 40

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 80

B. Rate the migration potential for 3 potential pathways: Surface water migration, flooding, and groundwater migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	3	8	24	24
Net precipitation	3	6	18	18
Surface erosion	2	8	16	24
Surface permeability	2	6	12	18
Rainfall intensity	2	8	16	24
		Subtotals	86	108

Subscore (100 x factor score subtotal/maximum score subtotal) 80

2. Flooding | 1 | 1 | 1 | 3

Subscore (100 x factor score/3) 33

3. Groundwater migration

Depth to groundwater	2	8	16	24
Net precipitation	3	6	18	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to groundwater	2	8	16	24
		Subtotals	58	114

Subscore (100 x factor score subtotal/maximum score subtotal) 51

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	48
Waste Characteristics	40
Pathways	80
Total 168 divided by 3 =	56
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

56 x 1 = 56

134th Air Refueling Group

Tennessee Air National Guard

McGhee-Tyson Municipal Airport

Knoxville, Tennessee

USAF Hazard Assessment Rating Methodology Rating Factor Criteria

The following is an explanation of the HARM factor rating criteria for each of the seven proposed sites at the McGhee-Tyson ANGB. The receptor and pathway rating factors, which are identical in each of the seven proposed sites, will be stated once. The differences in rating factors for each of the four categories will be explained for each of the seven individual sites.

I. Receptors

A. Population within 1,000 feet of site. Factor Rating 3. Accounting for the population of the Base itself, the Army National Guard, and Airport installation, the total population greatly exceeds 100 people.

B. Distance to nearest well. Factor Rating 2. Persons living within one mile but further than 3,000 feet from the Base boundary use wells for drinking water.

C. Land use/zoning (within one mile radius). Factor Rating 3. Areas within a one mile radius of the Base are zoned for residential development. There are several residential subdivisions in close proximity to the Base boundaries.

D. Distance to installation boundary. Factor Rating 3. The maximum Base width is only 1,500 feet. Therefore, each of the seven proposed sites are within 1,000 feet of the Base boundary.

E. Critical Environments (within 1 mile radius of site). Factor Rating 0. There are no areas within a one mile radius of the Base boundaries that have been designated as critical habitats.

F. Water quality/use designation of nearest surface water body. Factor Rating 1. Streams and lakes near the Base are used for fishing and recreation.

G. Groundwater use of uppermost aquifer: Factor Rating 1. The soil-watertable or shallow groundwater is only sparsely used as a domestic water source in the vicinity of the Base.

H. Population served by surface water supplies 3 miles downstream of site. Factor Rating 0. Surface water 3 miles downstream is not used as a drinking water source.

I. Population served by aquifer supplies within 3 miles of site. Factor Rating 2. There are numerous wells in the vicinity of the Base used for drinking water. Population served by these water wells is greater than 50 but less than 1,000 persons.

II. Waste Characteristics

Site No. 1

A-1: Waste Quantity Factor Rating M (medium); with the extended period of use (10-15 years), it is possible that 21 to 85 drums of liquid waste have migrated into the soil or shallow groundwater.

A-2: Confidence Level-Factor Rating C. Base interviewees indicated that this site was a past FTA. Also, an on-site inspection observed a concrete structure previously used as a burning aircraft simulator.

A-3: Hazard Rating - Factor Rating H (high). With site No. 1 used for disposal of JP-4 and liquid waste generated by base facilities, the Sax toxicity for JP-4 and various liquid waste generated by Base facilities is three which corresponds to HARM rating of H (high) or 3.

Site No. 2

A-1: Waste Quantity: Factor Rating L (large). With this site used extensively from 1968 to 1978 and the large number of on-site waste holding drums observed in Base photographs, it is possible that 85 or more drums of liquid waste have migrated into the soil or shallow groundwater.

A-2: Confidence Level - Factor Rating C. Numerous Base interviewees confirmed that fire training exercises were extensively conducted at this site. Also Base photographs illustrated this past FTA location.

A-3: Hazard Rating - Factor Rating H (high), with site no. 2 previously used for the disposal of JP-4 and liquid waste generated by Base facilities is 3 which corresponds to a HARM rating of 3.

Site No. 3

A-1: Waste Quantity Factor Rating S (small) Base interviewees estimated that a minimum of 200 gallons of liquid waste was released. However, the amount of liquid waste released is probably less than 20 drums.

A-2: Confidence Level. Factor Rating C (conformed) Base Interviewees confirmed that liquid was released from the oil/water separator waste holding tank. An on-site inspection observed stress vegetation downgradient from the oil/water separator.

A-3: Hazard Rating. Factor Rating M (medium) The flash point of waste oil in the oil/water holding tank ranges from 80^{o} F to 140^{o} F which corresponds to a Sax toxicity rating of 2 which is a medium Harm Rating.

Site No. 4

A-1: Waste Quantity. Factor Rating S (small). The precise amount of waste released at this site is unknown. With only small spills reported by Base interviewees and the probable amount released is less than 1,000 gallons (20 drums), the amount of waste corresponds to a HARM small quantity.

A-2: Confidence Level - Factor Rating C (confirmed) on-site inspection observed migrating waste oil which originated from the oil/water separator holding tank.

A-3: Hazard Rating - Factor Rating M (medium) Scoring base on Sax toxicity of 2 which corresponds to a Medium HARM rating.

Site No. 5

A-1: Waste Quantity - Factor Rating L (large) The 2 acre areal site extent with the 40 foot long and 6 foot deep disposal trenches of this past base landfill indicated that a large volume of solid waste was disposed at this site.

A-2: Confidence Level - Factor Rating C (confirmed). Numerous Base interviewees reported this site as a Base solid waste disposal location used from 1957 to 1968.

A-3: Hazard Rating Factor Rating (L) General Base garbage disposed of as solid waste has a Sax rating of 1 which corresponds to a low HARM rating.

Site No. 6

A-1: Waste Quantity - Factor Rating L (large). The volume of JP-4 released from past JP-4 spills is in excess of 5,000 gallons which corresponds to a large HARM rating.

A-2: Confidence Level - Factor Rating C (confirmed). It was confirmed by numerous Base interviewees that significant JP-4 spills have occurred within the main POL facility.

A-3: Hazard Rating - Factor Rating H (high). JP-4 has a Sax toxicity level of 3 and a flash point below 80^{O} F which corresponds to a high HARM rating.

Site No. 7

A-1: Waste Quantity - Factor Rating S (small). Base interviewee reports of past oil release are estimated to be less than 200 gallons which corresponds to a small HARM quantity.

A-2: Confidence Level - Factor Rating H (high). Numerous Base interviewees reported past liquid waste in the storm drain downgradient from Bldg. 246.

A-3: Hazard Rating - Factor Rating M (medium). Liquid waste generated from Bldg. 246 has a Sax Toxicity rating of 2 which corresponds to a medium HARM rating.

B. Persistence Multiplier

Site Nos. 1,2,6 = 0.9
Site Nos. 3,4,7 = 0.8
Site Nos. 5 = 0.4

The persistence multiplier of 0.9 for Site Nos. 1,2, and 6 was based on JP-4 which is assigned the HARM category of "substituted and other ring compounds". Sites 3,4 and 7 were assigned a 0.8 persistence multiplier because liquid waste collected in the oil/water separator holding tank is classified under the HARM category of "straight chain Hydrocarbons". Site No. 5 was assigned a 0.4 persistence factor because general Base solid waste is assigned a HARM category of "Easily Biodegradable Compounds".

C. **Physical State Multiplier**

Site Nos. 1-4,6,7 - 1.0
Site Nos. 5 = 0.5

The waste substances released at sites 1-4, 6, 7, were liquids. Therefore, the physical state multiplier for each site is 1.0. Waste disposed of at site No. 5 is solid materials which corresponds to a physical state multiplier of 0.5.

III. **Pathways Category**

A. **Evidence of Contamination**

Site No. 1: No Evidence - Factor Rating 0.

Site No. 2: No Evidence - Factor Rating 0.

Site No. 3: Indirect Evidence Factor Rating 80. Obvious stress vegetation downgradient from oil/water separator. Confirmed Base interviewee reports of liquid waste release.

Site No. 4: Indirect Evidence Factor Rating 80. Visible on-site evidence of past liquid waste release in the drainage swale adjacent to the oil/water separator and visible liquid waste (oil stain) adjacent to the field bed distribution boxes. No other sources for liquid waste are directly adjacent to site No. 4.

Site No. 5: No Evidence - Factor Rating 0.

Site No. 6: No Evidence - Factor Rating 0.

Site No. 7: Indirect Evidence Factor Rating 80. Confirmed reports of liquid waste release in which Base interviewees reported waste oil in the storm drain downgradient from Bldg. 246 is indirect evidence of contaminant migration. The oil/water separator at Building No. 246 is the most adjacent source for liquid waste to the area in the storm drain where liquid waste was observed.

B.1 **Potential for Surface Water Contamination**

- Distance to Nearest Surface Water: Factor Rating 3 for sites Nos. 1,2,4,5,6,7. These sites are closer than 500 feet from any surface water (e.g., stream, storm sewer, or drainage ditch). Factor rating 2 for site No. 3. Site No. 3 is further than 500 feet but closer than 2,000 feet from any surface water route.

- o Net Precipitation: Factor Rating 3. The net precipitation at the Base averages 47 inches of rain and snow/year.

- o Soil Erosion: Factor Rating 2. With surface topographic slope at the Base ranging from 2-4%, there is a moderate risk of soil removal by surface erosion.

- o Surface Permeability: Factor Rating 2. Permeability rates for soil at the Base have been calculated to range from 10^{-4} to 10^{-6} cm/sec.

- o Rainfall Intensity Based on 1 Year 24 Hour Rainfall: Factor Rating 2. The 1 year, 24 hour rainfall ranges from 2.1 and 3.0 inches.

B.2 Potential for Flooding - Factor Rating 1. The Base is located within a 100 year cyclic flood plain.

B.3 Potential for Contaminated Groundwater

- o Depth to Groundwater: Factor Rating 2. Soil water table at the Base ranges from 20 to 50 feet.

- o Net Precipitation: Factor Rating 3. See B-1.

- o Soil Permeability: Factor Rating 1. Soil permeability, as calculated by SCS permeability calculations, decreases with depth thus minimizing the threat of groundwater contamination.

- o Subsurface Flows

- o Site No. 1-7: Factor Rating 0. With the yearly shallow water table being at least 20 feet below ground surface it is unlikely that any of the rated sites are periodically submerged below the shallow watertable.

- o Direct access to groundwater (through faults, fracture faulty well casing, subsidence, fissures, etc.)

  Site Nos. 1, 2, 3, 4, 6, 7: Factor Rating 2. With the low to moderate soil permeability at the Base, there is a moderate risk that liquid waste released at the surface could contaminate the shallow groundwater.

Site No. 5: Factor Rating 1. There is a low risk that hazardous leachate has migrated into the shallow groundwater from solid waste buried in site no. 5.

IV. Waste Management Practices Factor Multiplier

Site Nos. 1, 3, 4, 6, 7 = 1.0. None of these sites have any form of contaminant containment.

Site Nos. 2,5 = 0.95. The contaminant within these sites has been partially contained with a cover of excavated fill dirt. In addition, site No. 2 is also covered with asphalt.

Appendix E

Waste Water Treatment Plant and Environmental Sampling

APPENDIX E

Wastewater Treatment Plant and Environmental Sampling

The Air National Guard Base at the McGhee Tyson Airport, Knoxville has an on Base wastewater treatment plant. This facility consists of a gravity collection system, a 50,000 gallon septic tank, sand filtration treatment, and sludge drying beds. The wastewater facility is located at the southeast end of the Base (Bldg. 127). The wastewater is composed primarily of sanitary waste with a small amount of industrial waste. Before discharge into Lackey Creek, 100 % of this water receives treatment. Daily records are taken on the amount of effluent from the treatment plant. Based on the average monthly flow, the volume of water filtered through the plant is approximately 60,000 gallons per day. The effluent is discharged into Lackey Creek which flows into Fort Loudon Lake.

The sewage treatment plant is currently operating under a National Pollutant Discharge Elimination System (NPDES) permit No. TN0021954. This permit specifies final effluent limitations and monitoring requirements (pp. E-3 thru E-7). The NPDES permit also requires that the source and ambient monitoring be performed at specific monitoring points as shown in pages E-8 thru E-15. The four sampling points and a description of each are listed as follows:

Sampling Site		Descriptions
(1)	0322-NS-001 (Sewage Treatment Plant)	The monitoring site is located at the discarge weir of chlorine contact chamber at the sewage plant. Outfall discharge into Lackey Creek to the Fort Loudon Lake.
(2)	0332-NA-002 (Flightline Discharge)	Site is located west of the sewage treatment plant discharge. Flow continues on into Lackey Creek to Fort Loudon Lake.
(3)	0332-NA-001 (Creek Exiting Base)	Site is located near the Leadership Evaluation Course, where Lackey Creek goes through the fence on to Fort Loudon Lake.
(4)	0332-NS-004 (POL Tank Farm)	Site is located at the oil/water separator for the tank farm, to monitor the water layers.

Monitoring is a part of the ANG monitoring program and is required by the State of Tennessee. Monthly operating reports are submitted to the division of Water Pollution Control in Knoxville to assure that adequate operational control is being practiced. Some typical sample analyses are shown in pages E-16 thru E-28.

The existing sand filtration treatment facility appears to be operating within the permit requirements. With a 200,000 GPD capacity the sanitary system is currently operating at about 50% capacity. The present facility is doing an excellent job environmentally, but for economical reasons the master plan proposes to direct these wastes to the city of Alcoa POTW.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS - FINAL

1. These effluent limitations are to be achieved by the effective date of the permit, and shall remain in effect until permit expiration for outfall(s) Serial Number(s) 001-Sanitary Wastewater.

Such discharges shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTICS	DISCHARGE LIMITATIONS					MONITORING REQUIREMENTS		
	kg/day(lbs/day)		Other Units (mg/l)					
	Monthly Average	Weekly Average	Monthly Average	Weekly Average	Daily Max	Measurement Frequency	Sample Type	Sampling Point
Flow, m^3/day (MGD	----	----	----	----	----	Daily	Instantaneous	Effluent
Biochemical Oxygen Demand (5-day)	1.7(3.8)	2.6(5.6)	30.0	45.0	----	Monthly	Grab	Effluent
Total Suspended Solids	1.7(3.8)	2.6(5.6)	30.0	45.0	----	Monthly	Grab	Effluent
Fecal Coliform Bacteria, Geometric Mean	----	----	200/100 ml	400/100 ml	----	Monthly	Grab	Effluent
Total Residual Chlorine	----	----	----	----	2.0	2/Week	Grab	Effluent
Settleable Solids	----	----	----	----	1.0 ml/l	2/Week	Grab	Effluent
Dissolved Oxygen	----	----	----	----	1.0	2/Week	Grab	Effluent

2. The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored twice per week by a grab sample taken at the effluent.

3. There shall be no discharge of floating solids or visible foam in other than trace amounts.

4. The effluent shall not cause a visible sheen on the receiving waters.

5. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): nearest accessible point after final treatment but prior to actual discharge or mixing with the receiving waters.

6. The effluent limits, and any additional requirements, specified in the attached state certification supersede any less stringent effluent limits listed above. During any time period in which the more stringent state certification effluent limits are stayed or inoperable, the effluent limits listed above shall be in effect and fully enforceable.

a. General Requirements

Unless otherwise specified the following requirements are applicable to all discharges:

(1) There shall be no discharge of floating solids or visible foam in other than trace amounts.

(2) The pH shall not be less than 6.0 nor greater than 9.0 and shall be monitored at the frequency specified for flow.

(3) Samples shall be taken at the nearest accessible point after final treatment (at the effluent) but prior to actual discharge or mixing with the receiving waters.

b. Discharge Limitations and Monitoring Requirements

(1) Potable and industrial water treatment facilities including filters, softeners and demineralizers.

Effluent Characteristics	Dishcarge Limitations		Monitoring Requirements		
	Daily Average	Daily Maximum	Frequency	Type	Sample Location
Flow, m^3/Day (MGD)	----	----	Daily	N/A	Effluent
Total Suspended Solids	30 mg/l	50 mg/l	1/Week(1)	Equal Volume Composite	Effluent

NOTES: (1) May be reduced to 1/month for discharges less than 50,000 gpd (daily maximum).

(2) Cooling water, cooling tower blowdown and cleaning wastes orginating at space cooling facilities.

Effluent Characteristics	Discharge Limitations		Monitoring Requirements		
	Daily Average	Daily Maximum	Frequency	Type	Sample Location
Flow, m^3/Day (MGD)	----	----	Quarterly	N/A	Effluent
Chromium, Total	----	1.0 mg/l	Quarterly(2)	Grab	Effluent
Zinc, Total	0.5 mg/l	1.0 mg/l	Quarterly(2)	Grab	Effluent
Copper, Total	0.5 mg/l	1.0 mg/l	Quarterly(2)	Grab	Effluent
Temperature, °C(°F)	35(95)	38(100)	Quarterly	Grab	Effluent
Chlorine Residual	----	0.2 mg/l	During Addition	Grab	Effluent

NOTES:

(1) The above requirements are not applicable where:
(a) Facilities discharge less than 10,000 GPD and are specifically utilized for space cooling.
(b) Water conditioning chemicals utilized contain no chromium.
(c) Discharges do not result in violation of applicable water quality standards.

(2) Monitoring of this parameter is not required for discharges to which treatment or conditioning chemicals are not added to where added materials do not contain the material limited.

(3) Boiler blowdown originating at space heating facilities.

Effluent Characteristics	Discharge Limitations		Monitoring Requirements		
	Daily Average	Daily Maximum	Frequency	Type	Sample Location
Flow, m^3/Day (MGD)	----	----	Quarterly	N/A	Effluent
Temperature, °C(°F)	35(95)	38(100)	Quarterly	Grab	Effluent

The pH shall not be less than 6.0 nor greater than 10.0 standard units and shall be monitored quarterly.

NOTES:

(1) The above requirements are not applicable where:
(a) Facilities discharge less than 10,000 GPD and are specifically utilized for space heating.
(b) Disharges do not result in violation of applicable water quality standards.

(4) Vehicle and Equipment Cleaning Facilities

Effluent Characteristics	Discharge Limitations		Monitoring Requirements		
	Daily Average	Daily Maximum	Frequency	Type	Sample Location
Flow, m^3/Day (MGD)	----	----	Daily	N/A	Effluent
pH (std. units)	6.5	8.5	1/Month	Grab	Effluent
Oil and Grease	10 mg/l	15 mg/l	1/Month	Grab	Effluent
Total Suspended Solids	25 mg/l	40 mg/l	1/Month	Grab	Effluent
Phenols (Total)	1.0 mg/l	2.0 mg/l	1/Month(1)	Grab	Effluent
Biochemical Oxygen Demand (5-day)	30 mg/l	45 mg/l	1/Month(2)	Grab	Effluent
Fecal Coliform Bacteria (No. per 100 ml)	200	----	1/Month(2)	Grab	Effluent

NOTES:

(1) Required only at facilities at which stripping is performed.

(2) Required only at facilities at which sanitation equipment is cleaned.

(5) Painting and Corrosion Control Facilities

Effluent Characteristics	Discharge Limitations		Monitoring Requirements		
	Daily Average	Daily Maximum	Frequency	Type	Sample Location
Flow, m^3/Day (MGD)	----	----	Daily	N/A	Effluent
pH, (std. units)	----	----	1/Month	Grab	Effluent
Oil and Grease	10 mg/l	15 mg/l	1/Month	Grab	Effluent
Total Suspended Solids	25 mg/l	40 mg/l	1/Month	Grab	Effluent
Phenols (Total)	1.0 mg/l	2.0 mg/l	1/Quarter	Grab	Effluent

(6) Petroleum, Oil and Lubricant (POL) Storage and Handling Areas

Discharges, including surface runoff resulting from precipitation, shall not contain more than 15 mg/l of oil and grease as a daily maximum. Discharges from areas with a storage capacity of 40,000 gallons or more shall be monitored quarterly.

(7) Vehicle and Equipment Maintenance Areas

Discharges, including surface runoff resulting from precipitation, shall not contain more than 15 mg/l of oil and grease as a daily maximum and shall be monitored quarterly.

(8) Battery Maintenance

There shall be no discharge of pollutants from battery maintenance facilities.

(9) Photographic Laboratories

There shall be no discharge of pollutants from photographic laboratories.

(10) Firefighter Training Areas

Effluent Characteristics	Discharge Limitations		Monitoring Requriements		
	Daily Average	Daily Maximum	Frequency	Type	Sample Location
Flow, m^3/Day (MGD)	----	----	Upon Occurrence	N/A	Effluent
pH (std. units)	----	----	1/Quarter	Grab	Effluent
Biochemical Oxygen Demand (5-day)	----	45 mg/l	1/Quarter	Grab	Effluent
Oil and Grease	----	15 mg/l	1/Quarter	Grab	Effluent
Total Suspended Solids	----	50 mg/l	1/Quarter	Grab	Effluent

(11) Swimming Pools

Effluent Characteristics	Discharge Limitations		Monitoring Requriements		
	Daily Average	Daily Maximum	Frequency	Type	Sample Location
Flow, m^3/Day (MGD)	----	----	Upon Occurrence	N/A	Effluent
pH (std. units)	----	----	1/Month	Grab	Effluent
Total Suspended Solids	----	40 mg/l	1/Month	Grab	Effluent
Chlorine Residual(1)	----	0.2 mg/l	1/Month	Grab	Effluent

NOTES:

(1) Does not apply when potable water is used for filter backwash.

(12) Storm Sewers

The discharge limitations specified below are applicable to all discharges from storm sewer systems which receive waste discharges from any sources; they are not applicable to discharges consisting entirely of uncontaminated surface runoff.

Effluent Characteristics	Discharge Limitations		Monitoring Requriements		
	Daily Average	Daily Maximum	Frequency	Type	Sample Location
Flow, m^3/Day (MGD)	----	----	Note 1		Effluent
pH (std. units)	----	----	1/Quarter	Grab	Effluent
Oil and Grease	----	----	1/Quarter	Grab	Effluent
Total Suspended Solids	----	50 mg/l(2)	Quarterly	Grab	Effluent
Temperature °C(°F)	----	38 (100)	1/Quarter	Grab	Effluent

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Knoxville, Tennessee 37901-5000

134th AREFG Supplement 1
ANGR 19-7
1 October 1986

Environmental Planning

ENVIRONMENTAL POLLUTION MONITORING

ANGR 19-7, 15 October 1985, is supplemented as follows:

13. All units designated monitoring responsibilities in the sampling schedule (Attachment 1) will ensure the schedule is met in a timely manner.

13d. Data will be submitted to USAF OEHL according to the schedule in item 6 of attachment 1.

15b. Performs (through SGPB) source and ambient monitoring as in attachment 1.

15q (Added). Submits as samples (Through SGPB) to USAF OEHL/SA, Brooks AFB, TX 78235-5501, that require their analytical capabilities as indicated in attachment 1.

15r (Added). Provides Civil Engineering (134 CEF/DE) with copies of monitoring results which are required for reports submitted by them.

16a. Performs process and selected source monitoring as indicated in attachment 1 and accomplishes analysis or submits samples to Bioenviromental Engineering for analysis by USAF OEHL (forward samples to 134th Clinic/SGPB).

16h (Added). Submits samples to local state certified laboratories as required in attachment 1.

16i (Added). Provides Bioenviromental Engineering a copy of any local analytical results of projects requiring enviromental review.

HEADQUARTERS 134TH AIR REFUELING GROUP
OFFICIAL

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1 Atch
Listing of Monitoring Requirements

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LISTING OF MONITORING REQUIREMENTS

1. a. Site Description. Sewage Treatment Plan Effluent

b. Site Location. 35 48' 25" Latitude, 84 00' 30" Longitude

c. Sampling Site Identification Code. 0322-NS-001

d. Monitoring required by NPDES Permit No. TN0021954 (Enviromental Protection Agency, Region IV) and Department of Health and Enviroment, Division of Water Management.

e. Descriptive Paragraph. Monitoring site is located at the discharge weir of the chlorine contact chamber at the sewage treatment plant. Outfall discharge into Lackey Creek to Fort Loudon Lake.

f. Organizations Collecting Sample. 134 CEF/DE and 134 Clinic/SGPB.

g. Monitoring Requirements.

ANALYSIS REQUIRED	STANDARD	TYPE OF SAMPLING	SAMPLING FREQUENCY	SAMPLED BY	ANALYZED BY	SAMPLE SCHEDULE
Flow	--------	Instantaneous	5/Week	Contract	Contract	Daily
Biochemical Oxygen Demand C5 Day	30mg/l monthly average	Grab	1/Week	Contract	Contract	Mid Month
Total Suspended Solids	30mg/l Monthly average	Grab	Monthly	Contract	Contact	Mid Month
Fecal Coliform Bacteria (Geometric Mean)	200/100ml	Grab	Monthly	Contract	Contract	Mid Month
Total Residual Chlorine	2.0 Daily Maximum	Grab	5/Week	Contract	Contract	Mid Week
Settable Solids	1.0ml/l	Grab	2/Week	Contract	Contract	Mid Week
Dissolved Oxygen	1.0mg/l	Grab	5/Week	Contract	Contract	Mid Week
PH	-------	Grab	2/Week	Contract	Contract	Mid Week
Chemical Oxygen Demand	-------	Grab	1/Quarter	SGPB	OEHL	2nd Week 1st Month Quarter
Kjeldahl Nitrogen	-------	Grab	1/Quarter	SGPB	OEHL	Same as above

ANALYSIS REQUIRED	STANDARD	TYPE OF SAMPLING	SAMPLING FREQUENCY	SAMPLED BY	ANALYZED BY	SAMPLING SCHEDULE
Nitrate	----	Grab	1/quarter	SGPB	OEHL	2nd Week 1st Month Quarter
Oil&Grease	----	Grab	1/quarter	SGPB	OEHL	Same as above
Total Organic Carbon	----	Grab	1/quarter	SGPB	OEHL	Same as above
Total Phosphorous	----	Grab	1/quarter	SGPB	OEHL	Same as above
Total Cyanide	----	Grab	1/quarter	SGPB	OEHL	Same as above
Phenols	----	Grab	1/quarter	SGPB	OEHL	Same as above
Arsenic	----	Grab	1/quarter	SGPB	OEHL	Same as above
Cadmium	----	Grab	1/quarter	SGPB	OEHL	Same as above
Total Chromium	----	Grab	1/quarter	SGPB	OEHL	Same as above
Copper	----	Grab	1/quarter	SGPB	OEHL	Same as above
Iron	----	Grab	1/quarter	SGPB	OEHL	Same as above
Lead	----	Grab	1/quarter	SGPB	OEHL	Same as above
Mercury	----	Grab	1/quarter	SGPB	OEHL	Same as above
Nickel	----	Grab	1/quarter	SGPB	OEHL	Same as above
Silver	----	Grab	1/quarter	SGPB	OEHL	Same as above
Zinc	----	Grab	1/quarter	SGPB	OEHL	Same as above
Total Alkalinity	----	Grab	1/quarter	SGPB	OEHL	Same as above
Total Dissolved Solids	----	Grab	1/quarter	SGPB	OEHL	Same as above
Surfactants MBAS	----	Grab	1/quarter	SGPB	OEHL	Same as above

2. a. Site Description. Flightline Drainage.

b. Site Location. 35 48' 25" Latitude, 84 00' 25" Longitude

c. Sampling Site Identification Code. 0332-NA-002

d. Monitoring required by NPDES Permit No. TN0021954 (Environmental Protection Agency, Region IV) and Local Installation Policy.

e. Descriptive Paragraph. Monitoring site is located west (upstream) of the sewage treatment plant discharge. Flow continues on into Lackey Creek to Fort Loudon Lake.

f. Organizations Collecting Sample. 134th USAF Clinic/SGPB

ANALYSIS REQUIRED	STANDARD	TYPE OF SAMPLING	SAMPLING FREQUENCY	SAMPLED BY	ANALYZED BY	SAMPLING SCHEDULE
pH	-----	Grab	1/quarter	SGPB	SGPB	2nd Week of 1st quarter month
Oil/Grease	-----	Grab	1/quarter	SGPB	OEHL	Same as Above
Total Suspended Solids	-----	Grab	1/quarter	SGPB	OEHL	Same as Above
Temperature	100 F Maximum	Grab	1/quarter	SGPB	SGPB	Same as Above
Chemical Oxygen Demand	-----	Grab	1/quarter	SGPB	OEHL	Same as Above
Kjeldah Nitrogen	-----	Grab	1/quarter	SGPB	OEHL	Same as Above
Nitrate	-----	Grab	1/quarter	SGPB	OEHL	Same as Above
Total Organic Carbon	-----	Grab	1/quarter	SGPB	OEHL	Same as Above
Total Phosphorous	-----	Grab	1/quarter	SGPB	OEHL	Same as Above
Total Cyanide	-----	Grab	1/quarter	SGPB	OEHL	Same as Above
Phenols	-----	Grab	1/quarter	SGPB	OEHL	Same as Above

ANALYSIS REQUIRED	STANDARD	TYPE OF SAMPLING	SAMPLING FREQUENCY	SAMPLED BY	ANALYZED BY	SAMPLING SCHEDULE
Arsenic	-----	Grab	1/ uarter	SGPB	OEHL	2nd Week of 1st quarter month
Cadmium	-----	Grab	1/quarter	SGPB	OEHL	Same as Above
Total Chromium	-----	Grab	1/quarter	SGPB	OEHL	Same as Above
Copper	-----	Grab	1/quarter	SGPB	OEHL	Same as Above
Iron	-----	Grab	1/quarter	SGPB	OEHL	Same as Above
Lead	-----	Grab	1/quarter	SGPB	OEHL	Same as Above
Mercury	-----	Grab	1/quarter	SGPB	OEHL	Same as Above
Nickel	------	Grab	1/quarter	SGPB	OEHL	Same as Above
Silver	-----	Grab	1/quarter	SGPB	OEHL	Same as Above
Zinc	-----	Grab	1/quarter	SGPB	OEHL	Same as Above
Total Alkalinity	-----	Grab	1/quarter	SGPB	OEHL	Same as Above
Total Dissolved Solids	-----	Grab	1/quarter	SGPB	OEHL	Same as Above
Surfactants MBAS	-----	Grab	1/quarter	SGPB	OEHL	Same as Above

3. a. Site Description. Creek Exiting Base

b. Site Location. 35 48' 10" Latitude, 84 00' 35" Longitude

c. Sampling Site Identification Code. 0332-NA-001

d. Monitoring Required by local installation policy.

e. Descriptive Paragraph. Monitoring site is located near LEC Course, where Lackey Creek goes through fence on to Fort Loudon Lake.

f. Oragnizations Collecting Sample. 134th USAF Clinic/SGPB

ANALYSIS REQUIRED	STANDARD	TYPE OF SAMPLING	SAMPLING FREQUENCY	SAMPLED BY	ANALYZED BY	SAMPLING SCHEDULE
Chemical Oxygen Demand	-----	Grab	1/quarter	SGPB	OEHL	2nd Week of 1st quarter month
Kjeldah Nitrogen	-----	Grab	1/quarter	SGPB	OEHL	Same as Above
Nitrate	-----	Grab	1/quarter	SGPB	OEHL	Same as Above
Oil/Grease	-----	Grab	1/quarter	SGPB	OEHL	Same as Above
Total Organic Carbon	-----	Grab	1/quarter	SGPB	OEHL	Same as Above
Total Phosphorous	-----	Grab	1/quarter	SGPB	OEHL	Same as Above
Total Cyanide	-----	Grab	1/quarter	SGPB	OEHL	Same as Above
Phenols	-----	Grab	1/quarter	SGPB	OEHL	Same as Above
Arsenic	-----	Grab	1/quarter	SGPB	OEHL	Same as Above
Cadmium	-----	Grab	1/quarter	SGPB	OEHL	Same as Above
Total Chromium	-----	Grab	1/quarter	SGPB	OEHL	Same as Above
Copper	-----	Grab	1/quarter	SGPB	OEHL	Same as Above
Iron	-----	Grab	1/ uarter	SGPB	OEHL	Same as Above
Lead	-----	Grab	1/quarter	SGPB	OEHL	Same as Above

Mercury	-----	Grab	1/quarter	SGPB	OEHL	Same as Above
Nickel	------	Grab	1/quarter	SGPB	OEHL	Same as Above
Silver	-----	Grab	1/quarter	SGPB	OEHL	Same as Above
Zinc	-----	Grab	1/quarter	SGPB	OEHL	Same as Above
Total Alkalinity	-----	Grab	1/quarter	SGPB	OEHL	Same as Above
Total Dissolved Solids	-----	Grab	1/quarter	SGPB	OEHL	Same as Above
Surfactants MBAS	-----	Grab	1/ uarter	SGPB	OEHL	Same as Above Above

4. a. Site Description. POL Tank Farm

b. Site Location. 35 48' 15" Latitude, 84 00' 41" Longitude

c. Sampling Site Identification Code. 0332-NS-004

d. Monitoring required by NPDES Permit No. TN0021954 (Environmental Protection Agency Region IV).

e. Descriptive Paragraph. Monitoring site is located at the fuel water separator for the tank farm, to monitor the water layers

f. Organizations Collecting Sample. 134th USAF Clinic/SGPB

ANALYSIS REQUIRED	STANDARD	TYPE OF SAMPLING	SAMPLING FREQUENCY	SAMPLED BY	ANALYZED BY	SAMPLING SCHEDULE
Oil&Grease	15mg/l	Grab	1/quarter	SGPB	OEHL	2nd Week of 1st quarter
Oxygen Demand						

5. Other possible water monitoring locations:

a. Cooling system blowdown, if not to sewage treatment plant.

b. Boiler blowdown, if not to sewage treatment plant

c. Air Samples ----- Probably not

6. Submission of Local Monitoring Results to USAF/OEHL: All locally collected monitoring data will be sent to USAF OEHL every two years. SGPB will be responsible for coordinating data submission with 134 CEF/DE and the USAF/OEHL.

8 2.

2. LABORATORY PERFORMING ANALYSIS: OEHL — 086209 086215

3. REQUESTOR SAMPLE NO: CB870059

SAMPLE COLLECTION INFORMATION

4. DATE RECEIVED BY LAB: 29 Dec, 87

5. DATE ANALYSIS COMPLETED: 26 Jan. 88

7. SITE DESCRIPTION

ON-SITE ANALYTICAL RESULTS

8. SITE LOCATION NO

9. FLOWRATE AT SITE 00058 GAL/MIN

10. WEATHER 00041

16. WATER TEMP 00010 °C

17. PH 00400 UNITS

18. DISS O2 00300 MG/L

11. COLLECTION DATE/PERIOD

12. COLLECTORS NAME

19. RESULTS OF OTHER ON-SITE ANALYSES: DOWNSTREAM OF SEWAGE TREATMENT PLANT.

13. SAMPLING TECHNIQUE

14. PHONE NUMBER

15. REASON FOR SAMPLE SUBMISSION: NPDES #

SELECTED AND RESULTS

086209 — TION GROUP A (9)

	TAL	MG/L
Chemical Oxygen Demand	00340	15.
Total Organic CARBON as C	00680	1.
		.

086210 — TION GROUP B

NO SAMPLE RECEIVED

	TAL	MG/L
OIL & GREASE FREON-IR Meth.	00560	.

086211 — TION GROUP C (14)

	TOTAL	MG/L
AMMONIA as N	00610	.
NITRATE as N Cd Reduct. Method	00620	26.0
NITRITE as N	00615	.
TOTAL KJELDAHL NITROGEN as N	00625	0.9
PHOSPHORUS Ortho PO4 as P	70507	.
PHOSPHORUS as P	00665	10.4

086212 — ATION GROUP D (12)

	TOTAL	MG/L
CYANIDE	00720	0.09
CYANIDE Free, Amenable to Cl_2	00722	.

086213 — TION GROUP E (4)

	TAL	µG/L
PHENOLS	32730	12.
		.

086214 — TION GROUP F (007)

PARAMETER	DISS	TOTAL	µG/L
ARSENIC	01000	01002	10.
BARIUM	01005	01007	.
CADMIUM	01025	01027	<10.
CHROMIUM	01030	01034	<50.
CHROMIUM Hexavalent		01032	.
COPPER	01040	01042	<20.
IRON	01046	01045	<100.
LEAD	01049	01051	<20.
MANGANESE	01056	01055	.
MERCURY	71890	71900	<1.
NICKEL	01065	01067	<50.
SELENIUM	01145	01147	.
SILVER	01075	01077	<10.
ZINC	01090	01092	<50.
CALCIUM as Ca	00915	00916	. mg/l
MAGNESIUM as Mg	00925	00927	. mg/l
POTASSIUM	00935	00937	. mg/l
SODIUM	00930	00929	. mg/l

086215 — TION GROUP G (4)

	TAL	MG/L
BORON	01022	. µg/l
BORON, Dissolved	01020	. µg/l
CHLORIDE	00940	.
COLOR	00080	Units
FLUORIDE	00951	.
Residue Filterable (TDS)	00515	579.
Residue Non Filt (SS)	00530	.
Residue	00500	.
Residue Volatile	00505	.
Specific Conductance	00095	µmhos
SULFATE as SO_4	00945	.
SURFACTANTS MBAS as LAS	38260	0.3
TURBIDITY	00076	Units
TOTAL ALKALINITY EQUIC		120

PRESERVATION GROUP J

PARAMETER

1. ORGANIZATION REQUESTING ANALYSIS

124th USAF CLINIC/SGPB

McGhee Tyson ANG

Knoxville TN 37950-5000

CHEMIST: 330 ENVMTP MT

REVIEWED BY

APPROVED BY

AFSC Form 3145, DEC 85 REPLACES AMD FORM 201, MAR 83, WHICH IS OBSOLETE. NON-POTABLE WATER ANALYSIS

8.04

LABORATORY PERFORMING ANALYSIS: UB6216 086221

4. REQUESTOR SAMPLE NO: GDS700060 00020

SAMPLE COLLECTION INFORMATION

7. SITE DESCRIPTION

5. DATE RECEIVED BY LAB: 29 Dec. 87

6. DATE ANALYSIS COMPLETED: 20 Jan. 88

8. SITE LOCATION NO | 9. FLOWRATE AT SITE 00058 GAL/MIN | 10. WEATHER 00041

ON-SITE ANALYTICAL RESULTS

16. WATER TEMP 00010 °C | 17. PH 00400 UNITS | 18. DISS O2 00300 MG/L

11. COLLECTION DATE/PERIOD | 12. COLLECTORS NAME

19. RESULTS OF OTHER ON-SITE ANALYSES: FLIGHTLINE DRAINAGE DOWNSTREAM OF SEWAGE TREATMENT PLANT

13. SAMPLING TECHNIQUE | 14. PHONE NUMBER

15. REASON FOR SAMPLE SUBMISSION: NPDES

086216 PRESERVATION GROUP A (9)

PARAMETER	TOTAL	MG/L
Chemical Oxygen Demand	00340	10
Total Organic CARBON as C	00680	1

PRESERVATION GROUP B

PARAMETER	TOTAL	MG/L
OIL & GREASE FREON-IR Method	00560	

086217 PRESERVATION GROUP C (14)

PARAMETER	TOTAL	MG/L
AMMONIA as N	00610	
NITRATE as N Cd Reduct. Method	00620	28.5
NITRITE as N	00615	
TOTAL KJELDAHL NITROGEN as N	00625	0.8
PHOSPHORUS Ortho PO4 as P	70507	
PHOSPHORUS as P	00665	10.8

086218 PRESERVATION GROUP D (12)

PARAMETER	TOTAL	MG/L
CYANIDE	00720	0.12
CYANIDE Free, Amenable to Cl_2	00722	

086219 PRESERVATION GROUP E (4)

PARAMETER	TOTAL	µG/L
PHENOLS	32730	<10

086220 PRESERVATION GROUP F (7)

PARAMETER	TOTAL	TOTAL	µG/L
ARSENIC	01000	01002	11
BARIUM	01005	01007	
CADMIUM	01025	01027	<10
CHROMIUM	01030	01034	<50
CHROMIUM Hexavalent		01032	
COPPER	01040	01042	<20
IRON	01045	01045	<100
LEAD	01049	01051	<20
MANGANESE	01056	01055	
MERCURY	71890	71900	<1
NICKEL	01065	01067	<50
SELENIUM	01145	01147	
SILVER	01075	01077	<10
ZINC	01090	01092	<50
CALCIUM as Ca	00915	00916	mg/l
MAGNESIUM as Mg	00925	00927	mg/l
POTASSIUM	00935	00937	mg/l
SODIUM	00930	00929	mg/l

086221 PRESERVATION GROUP G (11)

PARAMETER	TOTAL	MG/L
BORON	01022	µg/l
BORON, Dissolved	01020	µg/l
CHLORIDE	00940	
COLOR	00080	Units
FLUORIDE	00951	
Residue Filterable (TDS)	00515	552
Residue Non Filt (SS)	00530	
Residue	00500	
Residue Volatile	00505	
Specific Conductance	00095	µmhos
SULFATE as SO_4	00945	
SURFACTANTS MBAS as LAS	38260	0.3
TURBIDITY	00076	Units
TOTAL ALKALINITY	00410	120

PRESERVATION GROUP J

PARAMETER		

1. ORGANIZATION REQUESTING ANALYSIS: McClure Tyson ANG

CHEMIST: JBC EHWMTP

REVIEWED BY:

APPROVED BY:

AFSC Form 3145, DEC 85 REPLACES AMD FORM 201, MAR 83, WHICH IS OBSOLETE. NON-POTABLE WATER ANALYSIS

8.24

1. LABORATORY PERFORMING ANALYSIS: OEHL

086222 086227

4. REQUESTOR SAMPLE NO: GB870061 00010

SAMPLE COLLECTION INFORMATION

7. SITE DESCRIPTION

5. DATE RECEIVED BY LAB: 29 Dec. 87

6. DATE ANALYSIS COMPLETED: 20 Jan. 88

8. SITE LOCATION NO

9. FLOWRATE AT SITE 00056 GAL/MIN

10. WEATHER 00041

ON-SITE ANALYTICAL RESULTS

16. WATER TEMP 00010 °C

17. PH 00400 UNITS

18. DISS O_2 00300 MG/L

11. COLLECTION DATE/PERIOD

12. COLLECTORS NAME

19. RESULTS OF OTHER ON-SITE ANALYSES: THIS SITE IS CREEK EXITING BASE NEAR LAC COURSE

13. SAMPLING TECHNIQUE

14. PHONE NUMBER

15. REASON FOR SAMPLE SUBMISSION: NPDES

086222 — TION GROUP A (9)

	TOTAL	MG/L
Chemical Oxygen Demand	00340	15.
Total Organic CARBON as C	00680	1.
		.

PRESERVATION GROUP B

PARAMETER	TOTAL	MG/L
OIL & GREASE FREON-IR Method	00560	.

086223 — TION GROUP C (11)

	TOTAL	MG/L
AMMONIA as N	00610	.
NITRATE as N Cd Reduct. Method	00620	29.5
NITRITE as N	00615	.
TOTAL KJELDAHL NITROGEN as N	00625	0.9
PHOSPHORUS Ortho PO4 as P	70507	.
PHOSPHORUS as P	00665	11.0

086224 — TION GROUP D (12)

	TOTAL	MG/L
CYANIDE	00720	0.11
CYANIDE Free, Amenable to Cl_2	00722	.

086225 — TION GROUP E (4)

	TOTAL	µG/L
PHENOLS	32730	<10.
		.

086226 — TED AND RESULTS — TION GROUP F (10)

		TOTAL	µG/L
ARSENIC	01000	01002	12.
BARIUM	01005	01007	.
CADMIUM	01025	01027	<10.
CHROMIUM	01030	01034	<50.
CHROMIUM Hexavalent		01032	.
COPPER	01040	01042	<20.
IRON	01046	01045	<100.
LEAD	01049	01051	<20.
MANGANESE	01056	01055	.
MERCURY	71890	71900	<1.
NICKEL	01065	01067	<50.
SELENIUM	01145	01147	.
SILVER	01075	01077	<10.
ZINC	01090	01092	<50.
CALCIUM as Ca	00915	00916	. mg/l
MAGNESIUM as Mg	00925	00927	. mg/l
POTASSIUM	00935	00937	. mg/l
SODIUM	00930	00929	. mg/l

086227 — TION GROUP G (99)

	TOTAL	MG/L
BORON	01022	. µg/l
BORON, Dissolved	01020	. µg/l
CHLORIDE	00940	.
COLOR	00080	Units
FLUORIDE	00951	.
Residue Filterable (TDS)	00515	588.
Residue Non Filt (SS)	00530	.
Residue	00500	.
Residue Volatile	00505	.
Specific Conductance	00095	µmhos
SULFATE as SO_4	00945	.
SURFACTANTS MBAS as LAS	38260	0.3
TURBIDITY	00076	Units
TOTAL ALKALINITY	00410	120

PRESERVATION GROUP J

PARAMETER		

21. ORGANIZATION REQUESTING ANALYSIS: McAfee Dyson CNG

CHEMIST: JSO ENVMTP MT

REVIEWED BY

APPROVED BY

AFSC Form 3145, DEC 85 REPLACES AMD FORM 201, MAR 83, WHICH IS OBSOLETE. NON-POTABLE WATER ANALYSIS

(1 - 1

1. LABORATORY PERFORMING ANALYSIS	086228 086229	4. REQUESTOR SAMPLE NO
CEHL		GB87C062 00029

SAMPLE COLLECTION INFORMATION			5. DATE RECEIVED BY LAB	6. DATE ANALYSIS COMPLETED
7. SITE DESCRIPTION			29 Dec, 87	20 Jan, 88
			ON-SITE ANALYTICAL RESULTS	
8. SITE LOCATION NO	9. FLOWRATE AT SITE 00058 GAL/MIN	10. WEATHER 00041	16. WATER TEMP 00010 °C	17. PH 00400 UNITS
				18. DISS O_2 00300 MG/L
11. COLLECTION DATE/PERIOD		12. COLLECTORS NAME	19. RESULTS OF OTHER ON-SITE ANALYSES	
			POL TANK FARM	
13. SAMPLING TECHNIQUE		14. PHONE NUMBER		
15. REASON FOR SAMPLE SUBMISSION				
NPDES e				

ANALYSES REQUESTED AND RESULTS

086228

ATION GROUP A

	TOTAL	MG/L
Chemical Oxygen Demand	00340	<10 •
Total Organic CARBON as C	00680	•
		•

086229

ATION GROUP B

	TOTAL	MG/L
OIL & GREASE Freon-IR Meth	NO SAMPLE RECEIVED	•

PRESERVATION GROUP C

PARAMETER	TOTAL	MG/L
AMMONIA as N	00610	•
NITRATE as N Cd Reduct. Method	00620	•
NITRITE as N	00615	•
TOTAL KJELDAHL NITROGEN as N	00625	•
PHOSPHORUS Ortho PO4 as P	70507	•
PHOSPHORUS as P	00665	•

PRESERVATION GROUP D

PARAMETER	TOTAL	MG/L
CYANIDE	00720	•
CYANIDE Free, Amenable to Cl_2	00722	•

PRESERVATION GROUP E

PARAMETER	TOTAL	µG/L
PHENOLS	32730	•
		•

PRESERVATION GROUP F

PARAMETER	DISS	TOTAL	µG/L
ARSENIC	01000	01002	•
BARIUM	01005	01007	•
CADMIUM	01025	01027	•
CHROMIUM	01030	01034	•
CHROMIUM Hexavalent		01032	•
COPPER	01040	01042	•
IRON	01046	01045	•
LEAD	01049	01051	•
MANGANESE	01056	01055	•
MERCURY	71890	71900	•
NICKEL	01065	01067	•
SELENIUM	01145	01147	•
SILVER	01075	01077	•
ZINC	01090	01092	•
CALCIUM as Ca	00915	00916	• mg/l
MAGNESIUM as Mg	00925	00927	• mg/l
POTASSIUM	00935	00937	• mg/l
SODIUM	00930	00929	• mg/l

PRESERVATION GROUP G

PARAMETER	TOTAL	MG/L
BORON	01022	• µg/l
BORON, Dissolved	01020	• µg/l
CHLORIDE	00940	•
COLOR	00080	Units
FLUORIDE	00951	•
Residue Filterable (TDS)	00515	•
Residue Non Filt (SS)	00530	•
Residue	00500	•
Residue Volatile	00505	•
Specific Conductance	00095	µmhos
SULFATE as SO_4	00945	•
SURFACTANTS MBAS as LAS	38260	•
TURBIDITY	00076	Units

PRESERVATION GROUP J

PARAMETER		

3. ORGANIZATION REQUESTING ANALYSIS	CHEMIST
McArthur Dyson ANG	JSO
	REVIEWED BY
	APPROVED BY

AFSC Form 3145, DEC 85 REPLACES AMD FORM 201, MAR 83, WHICH IS OBSOLETE. NON-POTABLE WATER ANALYSIS

8.24

2. LABORATORY PERFORMING ANALYSIS		4. REQUESTOR SAMPLE NO
OEHL	042077 042083	GN870045 00029

SAMPLE COLLECTION INFORMATION

SITE DESCRIPTION	5. DATE RECEIVED BY LAB	6. DATE ANALYSIS COMPLETED
	10 July 87	20 July 87

8. SITE LOCATION NO	9. FLOWRATE AT SITE 00059 GAL/MIN	10. WEATHER 00041	16. WATER TEMP 00010 °C	17. PH 00400 UNITS	18. DISS O2 00300 MG/L

ON-SITE ANALYTICAL RESULTS

11. COLLECTION DATE/PERIOD	12. COLLECTORS NAME	19. RESULTS OF OTHER ON-SITE ANALYSES
		THIS MONITORING SITE IS LOCATED WEST (DOWNSTREAM) (~~UPSTREAM~~) OF THE SEWAGE TREATMENT PLANT DISCHARGE.
13. SAMPLING TECHNIQUE	14. PHONE NUMBER	
15. REASON FOR SAMPLE SUBMISSION: NPDES #		

TESTED AND RESULTS

042077 — PRESERVATION GROUP A (195)

PARAMETER	TOTAL	MG/L
Chemical Oxygen Demand	00340	<10.
Total Organic CARBON as C	00680	2.

042078 — PRESERVATION GROUP B

PARAMETER	TOTAL	MG/L
OIL & GREASE FREON-IR Method	00560	* NO SAMPLE RECEIVED

042079 — PRESERVATION GROUP C (261)

PARAMETER	TOTAL	MG/L
AMMONIA as N	00610	.
NITRATE as N Cd Reduct. Method	00620	32.0
NITRITE as N	00615	
TOTAL KJELDAHL NITROGEN as N	00625	1.8
PHOSPHORUS Ortho PO4 as P	70507	.
PHOSPHORUS as P	00665	6.75

042080 — PRESERVATION GROUP D (197)

PARAMETER	TOTAL	MG/L
CYANIDE	00720	0.05
CYANIDE Free, Amenable to Cl_2	00722	.

042081 — PRESERVATION GROUP E (196)

PARAMETER	TOTAL	µG/L
PHENOLS	32730	<10.

042082 — PRESERVATION GROUP F (197)

PARAMETER	DISS	TOTAL	µG/L
ARSENIC	01000	01002	10.
BARIUM	01005	01007	.
CADMIUM	01025	01027	<10.
CHROMIUM	01030	01034	<50.
CHROMIUM Hexavalent		01032	.
COPPER	01040	01042	27.
IRON	01046	01045	<100.
LEAD	01049	01051	<20.
MANGANESE	01056	01055	.
MERCURY	71890	71900	<1.
NICKEL	01065	01067	<50.
SELENIUM	01145	01147	.
SILVER	01075	01077	<10.
ZINC	01090	01092	<50.
CALCIUM as Ca	00915	00916	. mg/l
MAGNESIUM as Mg	00925	00927	. mg/l
POTASSIUM	00935	00937	. mg/l
SODIUM	00930	00929	. mg/l

042083 — PRESERVATION GROUP G (197)

PARAMETER	TOTAL	MG/L
BORON	01022	. µg/l
BORON, Dissolved	01020	. µg/l
CHLORIDE	00940	.
COLOR	00080	Units
FLUORIDE	00951	.
Residue Filterable (TDS)	00515	453.
Residue Non Filt (SS)	00530	.
Residue	00500	.
Residue Volatile	00505	.
Specific Conductance	00095	µmhos
SULFATE as SO_4	00945	.
SURFACTANTS MBAS as LAS	38260	0.2
TURBIDITY	00076	Units
ALKA, T		85

PRESERVATION GROUP J

PARAMETER		

1. ORGANIZATION REQUESTING ANALYSIS	CHEMIST
* For Oil & Grease analysis, we must have a ~~separate~~ separate sample in a glass container preserved with Sulfuric Acid. MC GHEE TYSON ANG	[illegible] EHJMTPTEK
	REVIEWED BY
	APPROVED BY [signature]

8.24

5. LABORATORY PERFORMING ANALYSIS	7. LAB SAMPLE	042090	4. REQUESTOR SAMPLE NO
DEHL	042084		GN870046 00020

SAMPLE COLLECTION INFORMATION	5. DATE RECEIVED BY LAB	6. DATE ANALYSIS COMPLETED
SITE DESCRIPTION 13	10 Jun 87	20 Jun 87

ON-SITE ANALYTICAL RESULTS

9. SITE LOCATION NO	8. FLOWRATE AT SITE 00058 GAL/MIN	10. WEATHER 00041	16. WATER TEMP 00010 °C	17. PH 00400 UNITS	18. DISS O2 00300 MG/L

11. COLLECTION DATE/PERIOD	12. COLLECTORS NAME	19. RESULTS OF OTHER ON-SITE ANALYSES
		SEWAGE TREATMENT EFFLUENT. CRREK (UPSTREAM)
13. SAMPLING TECHNIQUE	14. PHONE NUMBER	
15. REASON FOR SAMPLE SUBMISSION		
NPDES		

042084 — PRESERVATION GROUP A (195)

PARAMETER	TOTAL	MG/L
Chemical Oxygen Demand	00340	<10.
Total Organic CARBON as C	00680	1.
		.

042085 — PRESERVATION GROUP B

PARAMETER	TOTAL	MG/L
OIL & GREASE FREON-IR Method	00560	NO SAMPLE RECEIVED .

042086 — PRESERVATION GROUP C (200)

PARAMETER	TOTAL	MG/L
Nitrogen as N	00610	.
NITRATE as N Cd Reduct. Method	00620	.
NITRITE as N	00615	.
TOTAL KJELDAHL NITROGEN as N	00625	1.8
PHOSPHORUS ortho PO4 as P	70507	.
PHOSPHORUS as P	00665	6.25

042087 — PRESERVATION GROUP D (197)

PARAMETER	TOTAL	MG/L
CYANIDE	00720	0.05
CYANIDE Free, Amenable to Cl_2	00722	.
		.

042088 — PRESERVATION GROUP E (196)

PARAMETER	TOTAL	µG/L
PHENOLS	32730	<10 .
		.

042089 — PRESERVATION GROUP F (197)

PARAMETER	DISS	TOTAL	
ARSENIC	01000	01002	12.
BARIUM	01005	01007	.
CADMIUM	01026	01027	<10.
CHROMIUM	01030	01034	<50.
CHROMIUM Hexavalent		01032	.
COPPER	01040	01042	21.
IRON	01046	01045	<100.
LEAD	01049	01051	<20.
MANGANESE	01056	01055	.
MERCURY	71890	71900	<1.
NICKEL	01065	01067	<50.
SELENIUM	01145	01147	.
SILVER	01075	01077	<10.
ZINC	01090	01092	<50.
CALCIUM as Ca	00916	00916	. mg/l
MAGNESIUM as Mg	00925	00927	. mg/l
POTASSIUM	00935	00937	. mg/l
SODIUM	00930	00929	. mg/l

042090 — PRESERVATION GROUP G (172)

PARAMETER	TOTAL	MG/L
BORON	01022	. µg/l
BORON, Dissolved	01020	. µg/l
CHLORIDE	00940	.
COLOR	00080	Units
FLUORIDE	00951	.
Residue Filterable (TDS)	00515	432.
Residue Non Filt (ES)	00530	.
Residue	00500	.
Residue Volatile	00505	.
Specific Conductance	00095	µmhos
SULFATE as SO_4	00945	.
SURFACTANTS MBAS as LAS	38260	0.2
TURBIDITY	00076	Units
[redacted]		
ALKALINITY		95

PRESERVATION GROUP J

PARAMETER		

7. ORGANIZATION REQUESTING ANALYSIS

McGHEE TYSON A-NG

CHEMIST DLC WKK DJL 7.41
KAB JSO SAT EMJMTP

REVIEWED BY

APPROVED BY

824

2. LABORATORY PERFORMING ANALYSIS: OEHL

1. LAB SAMPLE NUMBER: 015360 015361

4. REQUESTOR SAMPLE NO: GB 87 0088

SAMPLE COLLECTION INFORMATION

7. SITE DESCRIPTION: 13 MAR [illegible]

RECEIVED BY LAB: 13 March 87

8. DATE ANALYSIS COMPLETED: 1 April 87

ON-SITE ANALYTICAL RESULTS

5. SITE LOCATION NO	6. FLOWRATE AT SITE 00058 GAL/MIN	10. WEATHER/T. 00041	16. WATER TEMP 00010 °C	17. PH 00400 UNITS	18. DISS O2 00300 MG/L

11. COLLECTION DATE/PERIOD	12. COLLECTORS NAME	19. RESULTS OF OTHER ON-SITE ANALYSES
		POL TANK FARM

13. SAMPLING TECHNIQUE	14. PHONE NUMBER

15. REASON FOR SAMPLE SUBMISSION: NPDES

015360

ANALYSES REQUESTED AND RESULTS

PRESERVATION GROUP A (76)

PARAMETER	TOTAL	MG/L
Chemical Oxygen Demand	00340	29
Total Organic CARBON as C	00680	

015361

PRESERVATION GROUP B

PARAMETER	TOTAL	
OIL & GREASE FREON-IR Method	00560	Total IR

PRESERVATION GROUP C

PARAMETER	TOTAL	MG/L
AMMONIA as N	00610	
NITRATE as N Cd Reduct. Method	00620	
NITRITE as N	00615	
TOTAL KJELDAHL NITROGEN as N	00625	
PHOSPHORUS Ortho PO4 as P	70507	
PHOSPHORUS as P	00665	

PRESERVATION GROUP D

PARAMETER	TOTAL	MG/L
CYANIDE	00720	
CYANIDE Free, Amenable to Cl_2	00722	

PRESERVATION GROUP E

PARAMETER	TOTAL	µG/L
PHENOLS	32730	

PRESERVATION GROUP F

PARAMETER	DISS	TOTAL	µG/L
ARSENIC	01000	01002	
BARIUM	01005	01007	
CADMIUM	01025	01027	
CHROMIUM	01030	01034	
CHROMIUM Hexavalent		01032	
COPPER	01040	01042	
IRON	01046	01045	
LEAD	01049	01051	
MANGANESE	01056	01055	
MERCURY	71890	71900	
NICKEL	01065	01067	
SELENIUM	01145	01147	
SILVER	01075	01077	
ZINC	01090	01092	
CALCIUM as Ca	00915	00916	mg/l
MAGNESIUM as Mg	00925	00927	mg/l
POTASSIUM	00935	00937	mg/l
SODIUM	00930	00929	mg/l

PRESERVATION GROUP G

PARAMETER	TOTAL	MG/L
BORON	01022	µg/l
BORON, Dissolved	01020	µg/l
CHLORIDE	00940	
COLOR	00080	Units
FLUORIDE	00951	
Residue Filterable (TDS)	00515	
Residue Non Filt (SS)	00530	
Residue	00500	
Residue Volatile	00505	
Specific Conductance	00095	µmhos
SULFATE as SO_4	00945	
SURFACTANTS MBAS as LAS	38260	
TURBIDITY	00076	Units

PRESERVATION GROUP J

PARAMETER		

21. ORGANIZATION REQUESTING ANALYSIS: MCGHEE AWG

CHEMIST: DAT

REVIEWED BY:

APPROVED BY: David

AFSC Form 3145, DEC 85 REPLACES AMD FORM 201, MAR 83, WHICH IS OBSOLETE. NON-POTABLE WATER ANALYSIS

8.24

2. LABORATORY PERFORMING ANALYSIS	3. LAB SAMPLE NUMBER	4. REQUESTOR SAMPLE NO
OEHL	015346 015352	G087 0016

SAMPLE COLLECTION INFORMATION	5. DATE RECEIVED BY LAB	6. DATE ANALYSIS COMPLETED
7. SITE DESCRIPTION: 13 MAR 87 14 03	13 March 87	1 April 87

8. SITE LOCATION NO	9. FLOWRATE AT SITE 00058 GAL/MIN	10. WEATHER 00041
11. COLLECTION DATE/PERIOD	12. COLLECTORS NAME	
13. SAMPLING TECHNIQUE	14. PHONE NUMBER	
15. REASON FOR SAMPLE SUBMISSION		

ON-SITE ANALYTICAL RESULTS		
16. WATER TEMP 00010 °C	17. PH 00400 UNITS	18. DISS O2 00300 MG/L

19. RESULTS OF OTHER ON-SITE ANALYSES

FLIGHTLINE DRAINAGE DOWNSTREAM OF SEWAGE TREATMENT DISCHARGE

015346 — PRESERVATION GROUP A (38)

PARAMETER	TOTAL	MG/L
Chemical Oxygen Demand	00340	31.
Total Organic CARBON as C	00680	2.

015347 — PRESERVATION GROUP B

PARAMETER	TOTAL	MG/L
OIL & GREASE FREON-IR Method	00560	NC.

015348 — PRESERVATION GROUP C (09)

PARAMETER	TOTAL	MG/L
AMMONIA as N	00610	.
NITRATE as N Cd Reduct. Method	00620	5.2
NITRITE as N	00615	.
TOTAL KJELDAHL NITROGEN as N	00625	6.9
PHOSPHORUS Ortho PO4 as P	70507	.
PHOSPHORUS as P	00665	2.2

015349 — PRESERVATION GROUP D (03)

PARAMETER	TOTAL	MG/L
CYANIDE	00720	0.07
CYANIDE Free, Amenable to Cl_2	00722	.

015350 — PRESERVATION GROUP E

PARAMETER	TOTAL	µG/L
PHENOLS 075	32730	<10.

015351 — PRESERVATION GROUP F (78)

PARAMETER	DISS	TOTAL	µG/L
ARSENIC	01000	01002	<10.
BARIUM	01005	01007	.
CADMIUM	01025	01027	<10.
CHROMIUM	01030	01034	<50.
CHROMIUM Hexavalent		01032	.
COPPER	01040	01042	<20.
IRON	01046	01045	199.
LEAD	01049	01051	<20.
MANGANESE	01056	01055	.
MERCURY	71890	71900	<1.
NICKEL	01065	01067	<50.
SELENIUM	01145	01147	.
SILVER	01075	01077	<10.
ZINC	01090	01092	<50.
CALCIUM as Ca	00915	00916	. mg/l
MAGNESIUM as Mg	00925	00927	. mg/l
POTASSIUM	00935	00937	. mg/l
SODIUM	00930	00929	. mg/l

015352 — PRESERVATION GROUP G (05)

PARAMETER	TOTAL	MG/L
BORON	01022	. µg/l
BORON, Dissolved	01020	. µg/l
CHLORIDE	00940	.
COLOR	00080	Units
FLUORIDE	00951	.
Residue Filterable (TDS)	00515	318.
Residue Non Filt (SS)	00530	.
Residue	00500	.
Residue Volatile	00505	.
Specific Conductance	00095	µmhos
SULFATE as SO_4	00945	.
SURFACTANTS MBAS as LAS	38260	Φ .34
TURBIDITY	00076	Units
Alkalinity, tot		165

PRESERVATION GROUP J

PARAMETER		

21. ORGANIZATION REQUESTING ANALYSIS

McGHEE ANS

CHEMIST JSO Date
REHJM

REVIEWED BY

APPROVED BY

DAVID

EPA Form 3145, DEC 85 REPLACES AMD FORM 201, MAR 83, WHICH IS OBSOLETE. NON-POTABLE WATER ANALYSIS

(K1) 024

2. LABORATORY PERFORMING ANALYSIS	3. LAB SAMPLE NO	REQUESTOR SAMPLE NO
OEHL	015339 015345	GB 87 0015

SAMPLE COLLECTION INFORMATION

7. SITE DESCRIPTION	8. SITE LOCATION NO	9. FLOWRATE AT SITE 00080 GAL/MIN	10. WEATHER 00041	11. COLLECTION DATE/PERIOD	12. COLLECTORS NAME	13. SAMPLING TECHNIQUE	14. PHONE NUMBER	15. REASON FOR SAMPLE SUBMISSION
13 MAR [illegible] 87								

5. DATE RECEIVED BY LAB	6. DATE ANALYSIS COMPLETED
13 March 87	1 April 87

ON-SITE ANALYTICAL RESULTS

16. WATER TEMP 00010 °C	17. PH 00400 UNITS	18. DISS O2 00300 MG/L

19. RESULTS OF OTHER ON-SITE ANALYSES

THIS SITE IS LOCATED AT THE DISCHARGE WEIR OF Chlorine contact chamber at Sewage treatment plant

015339 — TION GROUP A (78)

PARAMETER	TOTAL	MG/L
Chemical Oxygen Demand	00340	34.
Total Organic CARBON as C	00680	3.

015340 — ON GROUP B

PARAMETER	TOTAL	MG/L
OIL & GREASE FREON-IR Method	00560	[illegible]

015341 — ON GROUP C (691)

PARAMETER	TOTAL	MG/L
AMMONIA as N	00610	.
NITRATE as N Cd Red. st. Method	00620	.
NITRITE as N	00615	.
TOTAL KJELDAHL NITROGEN as N	00625	6.5
PHOSPHORUS Ortho PO4 as P	70507	.
PHOSPHORUS as P	00665	2.5

015342 — ATION GROUP D (683)

PARAMETER	TOTAL	MG/L
CYANIDE	00720	0.07
CYANIDE Free, Amenable to Cl_2	00722	.

015343 — ATION GROUP E

PARAMETER	TOTAL	µG/L
PHENOLS (677)	32730	<10.

015344 — TED AND RESULTS — TION GROUP F (78)

PARAMETER	DISS	TOTAL	µG/L
ARSENIC	01000	01002	<10.
BARIUM	01005	01007	.
CADMIUM	01025	01027	<10.
CHROMIUM	01030	01034	<50.
CHROMIUM Hexavalent		01032	.
COPPER	01040	01042	<20.
IRON	01046	01045	281.
LEAD	01049	01051	<20.
MANGANESE	01056	01055	.
MERCURY	71890	71900	<1.
NICKEL	01065	01067	<50.
SELENIUM	01145	01147	.
SILVER	01075	01077	<10.
ZINC	01090	01092	<50.
CALCIUM as Ca	00915	00916	. mg/l
MAGNESIUM as Mg	00925	00927	. mg/l
POTASSIUM	00935	00937	. mg/l
SODIUM	00930	00929	. mg/l

015345 — N GROUP G (670)

PARAMETER	TOTAL	MG/L
BORON	01022	. µg/l
BORON, Dissolved	01020	. µg/l
CHLORIDE	00940	.
COLOR	00080	Units
FLUORIDE	00951	.
Residue Filterable (TDS)	00515	329.
Residue Non Filt (SS)	00530	.
Residue	00500	.
Residue Volatile	00505	.
Specific Conductance	00095	µmhos
SULFATE as SO_4	00945	.
SURFACTANTS MBAS as LAB	38260	0.34
TURBIDITY	00078	Units
Alkalinity, tot		165

PRESERVATION GROUP J

PARAMETER		

11. ORGANIZATION REQUESTING ANALYSIS

134th USAF CLINIC
TYSON AP
McGHEE ANG Nosville
37901-5000

CHEMIST JSO MD
KEHJM ROOM 09

REVIEWED BY

APPROVED BY

AFSC Form 3145, DEC 85 REPLACES AMD FORM 201, MAR 83, WHICH IS OBSOLETE. NON-POTABLE WATER ANALYSIS

8.24

2. LABORATORY PERFORMING ANALYS.	3. LAB SAMPLE NO.	4. REQUESTOR SAMPLE NO
OEHL	015353 015359	GB 87 0017

SAMPLE COLLECTION INFORMATION

5. DATE RECEIVED BY LAB	6. DATE ANALYSIS COMPLETED
13 March 87	1 April 87

7. SITE DESCRIPTION: 13 KER L.F. 14 03

ON-SITE ANALYTICAL RESULTS

8. SITE LOCATION NO	9. FLOWRATE AT SITE 00058 GAL/MIN	10. WEATHER 00041	16. WATER TEMP 00010 °C	17. PH 00400 UNITS	18. DISS O2 00300 MG/L

11. COLLECTION DATE/PERIOD	12. COLLECTORS NAME	19. RESULTS OF OTHER ON-SITE ANALYSES
		CRRRK FXMING BASE
13. SAMPLING TECHNIQUE	14. PHONE NUMBER	

15. REASON FOR SAMPLE SUBMISSION

NPDES

ANALYSES REQUESTED AND RESULTS

015353 — PRESERVATION GROUP A (78)

PARAMETER	TOTAL	MG/L
Chemical Oxygen Demand	00340	33.
Total Organic CARBON as C	00680	7.

015354 — PRESERVATION GROUP B

PARAMETER	TOTAL	MG/L
OIL & GREASE FREON-IR Method	00560	IPC.

015355 — PRESERVATION GROUP C (69)

PARAMETER	TOTAL	MG/L
AMMONIA as N	00610	.
NITRATE as N Cd Reduct. Method	00620	9.3
NITRITE as N	00615	.
TOTAL KJELDAHL NITROGEN as N	00625	6.3
PHOSPHORUS Ortho PO4 as P	70507	.
PHOSPHORUS as P	00665	2.6

015356 — PRESERVATION GROUP D (687)

PARAMETER	TOTAL	MG/L
CYANIDE	00720	0.07
CYANIDE Free, Amenable to Cl_2	00722	.

015357 — PRESERVATION GROUP E

PARAMETER	TOTAL	µG/L
PHENOLS (673)	32730	<10.

015358 — PRESERVATION GROUP F (78)

PARAMETER	DISS	TOTAL	µG/L
ARSENIC	01000	01002	<10.
BARIUM	01005	01007	.
CADMIUM	01025	01027	<10.
CHROMIUM	01030	01034	<50.
CHROMIUM Hexavalent		01032	.
COPPER	01040	01042	<20.
IRON	01046	01045	240.
LEAD	01049	01051	<20.
MANGANESE	01056	01055	.
MERCURY	71890	71900	<1.
NICKEL	01065	01067	<50.
SELENIUM	01145	01147	.
SILVER	01075	01077	<10.
ZINC	01090	01092	<50.

PARAMETER	DISS	TOTAL	mg/l
CALCIUM as Ca	00915	00916	.
MAGNESIUM as Mg	00925	00927	.
POTASSIUM	00935	00937	.
SODIUM	00930	00929	.

015359 — PRESERVATION GROUP G (78)

PARAMETER	TOTAL	MG/L
BORON	01022	. µg/l
BORON, Dissolved	01020	. µg/l
CHLORIDE	00940	.
COLOR	00080	Units
FLUORIDE	00951	.
Residue Filterable (TDS)	00515	322.
Residue Non Filt (SS)	00530	.
Residue	00500	.
Residue Volatile	00505	.
Specific Conductance	00095	µmhos
SULFATE as SO_4	00945	.
SURFACTANTS MBAS as LAS	38260	ϕ .32
TURBIDITY	00076	Units
Alkalinity, total		165

PRESERVATION GROUP J

PARAMETER		

1. ORGANIZATION REQUESTING ANALYSIS

McGHEE ANG

CHEMIST JSO DATE R EHJM R&RM

REVIEWED BY

APPROVED BY

AFSC Form 3145, DEC 85 REPLACES AMD FORM 201, MAR 83, WHICH IS OBSOLETE. NON-POTABLE WATER ANALYSIS

8.24

2. LABORATORY PERFORMING ANALYSIS	3. LAB SAMPLE NUMBER	4. REQUESTOR SAMPLE NO
OEHL	066180 066181	GB 87 0052

SAMPLE COLLECTION INFORMATION

5. SITE DESCRIPTION	6. DATE RECEIVED BY LAB	7. DATE ANALYSIS COMPLETED
-8 OCT-1987 12 57	8 Oct, 87	30 Oct, 87

8. SITE LOCATION NO	9. FLOWRATE AT SITE 00058 GAL/MIN	10. WEATHER 00041

ON-SITE ANALYTICAL RESULTS

16. WATER TEMP 00010 °C	17. PH 00400 UNITS	18. DISS O2 00300 MG/L

11. COLLECTION DATE/PERIOD	12. COLLECTORS NAME	19. RESULTS OF OTHER ON-SITE ANALYSES
		POL TANK FARM

13. SAMPLING TECHNIQUE	14. PHONE NUMBER

15. REASON FOR SAMPLE SUBMISSION

NPDES

066180

ANALYSES REQUESTED AND RESULTS

GROUP A (29)

PARAMETER	TOTAL	MG/L
Chemical Oxygen Demand	00340	25
Total Organic CARBON as C	00680	

066181

GROUP B

PARAMETER	TOTAL	MG/L
OIL & GREASE FREON TR MYHOD	00560	NOSAMPLE RECEIVED

PRESERVATION GROUP C

PARAMETER	TOTAL	MG/L
AMMONIA as N	00610	
NITRATE as N Cd Reduct. Method	00620	
NITRITE as N	00615	
TOTAL KJELDAHL NITROGEN as N	00625	
PHOSPHORUS Ortho PO4 as P	70507	
PHOSPHORUS as P	00665	

PRESERVATION GROUP D

PARAMETER	TOTAL	MG/L
CYANIDE	00720	
CYANIDE Free, Amenable to Cl_2	00722	

PRESERVATION GROUP E

PARAMETER	TOTAL	µG/L
PHENOLS	32730	

PRESERVATION GROUP F

PARAMETER	DISS	TOTAL	µG/L
ARSENIC	01000	01002	
BARIUM	01005	01007	
CADMIUM	01025	01027	
CHROMIUM	01030	01034	
CHROMIUM Hexavalent		01032	
COPPER	01040	01042	
IRON	01046	01045	
LEAD	01049	01051	
MANGANESE	01056	01055	
MERCURY	71890	71900	
NICKEL	01065	01067	
SELENIUM	01145	01147	
SILVER	01075	01077	
ZINC	01090	01092	
CALCIUM as Ca	00915	00916	mg/l
MAGNESIUM as Mg	00925	00927	mg/l
POTASSIUM	00935	00937	mg/l
SODIUM	00930	00929	mg/l

PRESERVATION GROUP G

PARAMETER	TOTAL	MG/L
BORON	01022	µg/l
BORON, Dissolved	01020	µg/l
CHLORIDE	02910	
COLOR	00080	Units
FLUORIDE	00951	
Residue Filterable (TDS)	00515	
Residue Non Filt (SS)	00530	
Residue	00500	
Residue Volatile	00505	
Specific Conductance	00095	µmhos
SULFATE as SO_4	00945	
SURFACTANTS MBAS as LAS	38260	
TURBIDITY	00076	Units

PRESERVATION GROUP J

PARAMETER		

11. ORGANIZATION REQUESTING ANALYSIS

McGhee Tyson ANG

CHEMIST JSO

REVIEWED BY

APPROVED BY

AFSC Form 3145, DEC 85 REPLACES AMD FORM 201, MAR 83, WHICH IS OBSOLETE. NON-POTABLE WATER ANALYSIS

DR 8.24

LABORATORY PERFORMING ANALYSIS	3. LAB SAMPLE NUMBER	4. REQUESTOR SAMPLE NO
OEHL	066173 066179	GB 87 0057

SAMPLE COLLECTION INFORMATION

SITE DESCRIPTION — 8 OCT 1987 12 57

DATE RECEIVED BY LAB: 8 Oct. 87 — 6. DATE ANALYSIS COMPLETED: 30 Oct. 87

ON-SITE ANALYTICAL RESULTS

SITE LOCATION NO	9. FLOWRATE AT SITE 00058 GAL/MIN	10. WEATHER 00041	16. WATER TEMP 00010 °C	17. PH 00400 UNITS	18. DISS O2 00300 MG/L

COLLECTION DATE/PERIOD — 12. COLLECTORS NAME — 19. RESULTS OF OTHER ON-SITE ANALYSES: CREEK EXITING BASE

SAMPLING TECHNIQUE — 14. PHONE NUMBER

REASON FOR SAMPLE SUBMISSION

NPDES #

066173 — ANALYSIS 066178 AND RESULTS — 066179 (303)

GROUP A (292)

PARAMETER	TOTAL	MG/L
Chemical Oxygen Demand	00340	10.
Total Organic CARBON as C	00680	5.

066174

GROUP B

PARAMETER	TOTAL	MG/L
OIL & GREASE FREON-IR Method	00560	NO SAMPLE RECEIVED

066175

GROUP C (249)

PARAMETER	TOTAL	MG/L
AMMONIA as N	00610	
NITRATE as N Cd Reduct. Method	00620	40.0
NITRITE as N	00615	
TOTAL KJELDAHL NITROGEN as N	00625	1.0
PHOSPHORUS Ortho PO4 as P	70507	
PHOSPHORUS as P	00665	6.3

066176

GROUP D (248)

PARAMETER	TOTAL	MG/L
CYANIDE	00720	0.03
CYANIDE Free, Amenable to Cl2	00722	

066177

GROUP E (288)

PARAMETER	TOTAL	µG/L
PHENOLS	32730	<10

GROUP F (288) µG/L

PARAMETER	DISS	TOTAL	µG/L
ARSENIC	01000	01002	11
BARIUM	01005	01007	
CADMIUM	01025	01027	<10
CHROMIUM	01030	01034	<50
CHROMIUM Hexavalent		01032	
COPPER	01040	01042	<20
IRON	01046	01045	<100
LEAD	01049	01051	<20
MANGANESE	01056	01055	
MERCURY	71890	71900	<1
NICKEL	01065	01067	<50
SELENIUM	01145	01147	
SILVER	01075	01077	<10
ZINC	01090	01092	<50
CALCIUM as Ca	00915	00916	mg/l
MAGNESIUM as Mg	00925	00927	mg/l
POTASSIUM	00935	00937	mg/l
SODIUM	00930	00929	mg/l

GROUP G

PARAMETER	TOTAL	MG/L
BORON	01022	µg/l
BORON, Dissolved	01020	µg/l
CHLORIDE	00940	
COLOR	00080	Units
FLUORIDE	00951	
Residue Filterable (TDS)	00515	518.
Residue Non Filt (SS)	00530	
Residue	00500	
Residue Volatile	00505	
Specific Conductance	00095	µmhos
SULFATE as SO_4	00945	
SURFACTANTS MBAS as LAS	38260	0.2
TURBIDITY	00076	Units
Alkalinity, Total		105

PRESERVATION GROUP J

PARAMETER		

ORGANIZATION REQUESTING ANALYSIS

McGhee Tyson ANG

CHEMIST: [illegible]

REVIEWED BY

APPROVED BY [signature]

USAFOEHL/SC Form 3145, DEC 85 REPLACES AMD FORM 201, MAR 83, WHICH IS OBSOLETE. NON-POTABLE WATER ANALYSIS

05 8-24

2. LABORATORY PERFORMING ANALYSIS	3. LAB SAMPLE NUMBER	4. REQUESTOR SAMPLE NO
OEHL	066166-66172 00005	GB 87 0050 00029

SAMPLE COLLECTION INFORMATION	5. DATE RECEIVED BY LAB	6. DATE ANALYSIS COMPLETED
7. SITE DESCRIPTION -8 OCT 1987 12 57	8 OCT 87	30 OCT 87

ON-SITE ANALYTICAL RESULTS

8. SITE LOCATION NO	9. FLOWRATE AT SITE 00058 GAL/MIN	10. WEATHER 00041	16. WATER TEMP 00010 °C	17. PH 00400 UNITS	18. DISS O2 00300 MG/L

11. COLLECTION DATE/PERIOD	12. COLLECTORS NAME	19. RESULTS OF OTHER ON-SITE ANALYSES
		CREEK NEAR SEWAGE TREATMENT BED.
13. SAMPLING TECHNIQUE	14. PHONE NUMBER	
15. REASON FOR SAMPLE SUBMISSION		
NPDES #		

ANALYSES AND RESULTS

066166 GROUP A (292)			066171 GROUP F (288)				066172 GROUP G (303)		
PARAMETER	TOTAL	MG/L	PARAMETER	DISS	TOTAL	µG/L	PARAMETER	TOTAL	MG/L
Chemical Oxygen Demand	00340	<10	ARSENIC	01000	01002	12	BORON	01022	µg/l
Total Organic CARBON as C	00680	4	BARIUM	01005	01007		BORON, Dissolved	01020	µg/l
066167 GROUP B			CADMIUM	01025	01027	<10	CHLORIDE	00940	
PARAMETER	TOTAL	MG/L	CHROMIUM	01030	01034	<50	COLOR	00080	Units
OIL & GREASE FREON-IR Method	00560	NO SAMPLE RECEIVED	CHROMIUM Hexavalent		01032	<50	FLUORIDE	00951	
066168 GROUP C (294)			COPPER	01040	01042	<20	Residue Filterable (TDS)	00515	510
PARAMETER	TOTAL	MG/L	IRON	01046	01045	<100	Residue Non Filt (SS)	00530	
AMMONIA as N	00610		LEAD	01049	01051	<20	Residue	00500	
NITRATE as N Cd Reduct. Method	00620		MANGANESE	01056	01055		Residue Volatile	00505	
NITRITE as N	00615		MERCURY	71890	71900	<1.	Specific Conductance	00095	µmhos
TOTAL KJELDAHL NITROGEN as N	00625	1.0	NICKEL	01065	01067	<50	SULFATE as SO4	00945	
PHOSPHORUS Ortho PO4 as P	70507		SELENIUM	01145	01147		SURFACTANTS MBAS as LAS	38260	0.3
PHOSPHORUS as P	00665	6.1	SILVER	01075	01077	<10	TURBIDITY	00076	Units
066169 GROUP D (299)			ZINC	01090	01092	<50	Alkalinity, Total		105
PARAMETER	TOTAL	MG/L	CALCIUM as Ca	00915	00916	mg/l			
CYANIDE	00720	0.09	MAGNESIUM as Mg	00925	00927	mg/l			
CYANIDE Free, Amenable to Cl.	00722		POTASSIUM	00935	00937	mg/l			
066170 GROUP E (288)			SODIUM	00930	00929	mg/l			
PARAMETER	TOTAL	µG/L					PRESERVATION GROUP J		
PHENOLS	32730	<10					PARAMETER		

1. ORGANIZATION REQUESTING ANALYSIS	CHEMIST
McGhee Tyson ANG	EH JMMEL JSO DB
	REVIEWED BY
	APPROVED BY [signature]

AFSC Form 3145, DEC 85 REPLACES AMD FORM 201, MAR 83, WHICH IS OBSOLETE. NON-POTABLE WATER ANALYSIS

2. LABORATORY PERFORMING ANALYSIS	3. LAB SAMPLE NUMBER	4. REQUESTOR SAMPLE NO
DEHL	066159 066165 00009	GB 87 0049 00010

SAMPLE COLLECTION INFORMATION

5. SITE DESCRIPTION	6. DATE RECEIVED BY LAB	7. DATE ANALYSIS COMPLETED
-8 OCT 1037 12 56	8 OCT. 87	30 OCT. 87

ON-SITE ANALYTICAL RESULTS

8. SITE LOCATION NO	9. FLOWRATE AT SITE 00058 GAL/MIN	10. WEATHER 00041	16. WATER TEMP 00010 °C	17. PH 00400 UNITS	18. DISS O2 00300 MG/L

11. COLLECTION DATE/PERIOD	12. COLLECTORS NAME	19. RESULTS OF OTHER ON-SITE ANALYSES
		DOWNSTREAM OF SEWAGE TREATMENT DISCHARGE
13. SAMPLING TECHNIQUE	14. PHONE NUMBER	

15. REASON FOR SAMPLE SUBMISSION

NPDES

066159 ANALYSES AND RESULTS 066164 066165 (303)

066159 — GROUP A (289)

PARAMETER	TOTAL	MG/L
Chemical Oxygen Demand	00340	<10.
Total Organic CARBON as C	00680	5.

066160 — GROUP B

PARAMETER	TOTAL	MG/L
OIL & GREASE FREON-IR METHOD	00560	NO SAMPLE RECEIVED

066161 — GROUP C (294)

PARAMETER	TOTAL	MG/L
AMMONIA as N	00610	
NITRATE as N Cd Reduct. Method	00620	39.2
NITRITE as N	00615	
TOTAL KJELDAHL NITROGEN as N	00625	0.9
PHOSPHORUS Ortho PO4 as P	70507	
PHOSPHORUS as P	00665	6.6

066162 — GROUP D (288)

PARAMETER	TOTAL	MG/L
CYANIDE	00720	0.08
CYANIDE Free, Amenable to Cl_2	00722	

066163 — GROUP E (288)

PARAMETER	TOTAL	MG/L
PHENOLS	32730	<10.

066164 — GROUP F (286)

PARAMETER	DISS	TOTAL	µG/L
ARSENIC	01000	01002	12.
BARIUM	01005	01007	
CADMIUM	01025	01027	<10.
CHROMIUM	01030	01034	<50.
CHROMIUM Hexavalent		01032	
COPPER	01040	01042	<20.
IRON	01045	01045	<100.
LEAD	01049	01051	<20.
MANGANESE	01056	01055	
MERCURY	71890	71900	<1.
NICKEL	01065	01067	<50.
SELENIUM	01145	01147	
SILVER	01075	01077	<10.
ZINC	01090	01092	<50.
CALCIUM as Ca	00915	00916	mg/l
MAGNESIUM as Mg	00925	00927	mg/l
POTASSIUM	00935	00937	mg/l
SODIUM	00930	00929	mg/l

066165 — GROUP G (303)

PARAMETER	TOTAL	MG/L
BORON	01022	µg/l
BORON, Dissolved	01020	µg/l
CHLORIDE	00940	
COLOR	00080	Units
FLUORIDE	00951	
Residue Filterable (TDS)	00515	479.
Residue Non Filt (SS)	00530	
Residue	00500	
Residue Volatile	00505	
Specific Conductance	00095	µmhos
SULFATE as SO_4	00945	
SURFACTANTS MBAS as LAS	38260	0.4
TURBIDITY	00076	Units
Alkalinity, Total		105

PRESERVATION GROUP J

PARAMETER		

16. ORGANIZATION REQUESTING ANALYSIS

McGhee Tyson ANG

CHEMIST FH JTM JBO DT MAT

REVIEWED BY

APPROVED BY

AFSC Form 3145, DEC 85 REPLACES AMD FORM 201, MAR 83, WHICH IS OBSOLETE. NON-POTABLE WATER ANALYSIS

APPENDIX F
PCB Removal

APPENDIX F

PCB Removal

The McGhee-Tyson ANGB has been examined for the presence of Polychlorinated Biphenyls (PCB's). All transformer dielectric fluids and compressor oils have been extracted and disposed of by a private contractor. These fluids have been replaced with non-PCB containing fluids.

Fifty-two oil samples from transformers were collected in 1983 and an analysis was done by an independent testing firm for each sample. The analyses showed that the concentation of PCB's in the majority of samples was less than 4 ppm (pp. F-2 thru F-4). Additional oil samples from all compressors were taken in 1986 and analyzed by the USAF occupational and Environmental Health Laboratory (OEHL) with no PCB's being detected. Please refer to samples and results as shown in pages F-5 thru F-7.

All fluids from transformers have been removed and properly disposed of by an independent contractor, and were replaced by non-PCB containing fluids.

Because of proper testing and disposal practices, the Base is in compliance with the regulations concerning the control and disposal of PCB's and/or PCB-contaminated materials.

IT CORPORATION

IT ANALYTICAL SERVICES

STEWART LABORATORIES DIVISION
5815 Middlebrook Pike • Knoxville, Tennessee 37921 • 615-588-6401

CERTIFICATE OF ANALYSIS

TO: 134th Air Refueling Group/DE
McGhee Tyson Air Base
ATTN: Doug Hill
Knoxville, TN 37901

DATE REPORTED: October 19, 1983
PROJECT CODE: TAB 17028
ORDER NUMBER:

Sample Description: Fifty-two (52) oil samples received October 12, 1983. ASKAREL - CHEMICAL NAME

Concentration units are µg/gram (ppm)

LIGHTEST → TRADE NAMES

	Aroclor 1016, 1232, 1242 and/or 1248	Aroclor 1254	Aroclor 1260	Total Aroclors
Westinghouse, 100 KVA, Style 1294241-D, Serial #6114198	<4.	<4.	<4.	<4. ± 0.2
Westinghouse, 100 KVA, Style 1294241-D, Serial #6093329	<4.	<4.	<4.	<4. ± 0.2
Westinghouse, 100 KVA, Style 1294241-D, Serial #6093331	<4.	<4.	<4.	<4. ± 0.2
Westinghouse, 37½ KVA, Style KAK7059E37A, Serial #70AF5121581	<10.**	85.	<4.	85. ± 4.3
Westinghouse, 37½ KVA, Style KAK7059E37A, Serial #70AF5119581	<10.**	84.	<4.	84. ± 4.2
Westinghouse, 37½ KVA, Style KAK7059E37A, Serial #70AF5120581	<8.**	51.	<4.	51. ± 2.6
Westinghouse, 25 KVA, Style A1412N25C1A, Serial #56E2745	<4.	<4.	120.	120. ± 6.0
Westinghouse, 25 KVA, Style A1412N25C1A, Serial #55K12746	<4.	<4.	75.	75. ± 3.8
Westinghouse, 25 KVA, Style A1412N25C1A, Serial #55K12744	<4.	<4.	69.	69. ± 3.5
G.E., 5 KVA, Type HS, Serial #C277166	<4.	<4.	<4.	<4. ± 0.2
G.E., 5 KVA, Type HS, Serial #C277165	<4.	<4.	<4.	<4. ± 0.2
Howard, 10 KVA, Serial #95123-4777	<4.	<4.	<4.	<4. ± 0.2
Howard, 10 KVA, Serial #95122-4777	<4.	<4.	<4.	<4. ± 0.2
Howard, 10 KVA, Serial #95124-4777	<4.	<4.	<4.	<4. ± 0.2
Allis Chalmers, Type CBS, 25 KVA, Serial #7426-6384205	<4.	<4.	<4.	<4. ± 0.2
G.E., 5 KVA, Type HS, Serial #C281376	<4.	<4.	<4.	<4. ± 0.2

** Higher detection limit due to interference

	Aroclor 1016, 1232, 1242 and/or 1248	Aroclor 1254	Aroclor 1260	Total Aroclors
Delta-Star, 25 KVA, Type OS, Serial #E-53028	<4.	<4.	<4.	<4. ± 0.2
Wagner, 10 KVA, Type HEK, Serial #5P17929	<4.	<4.	<4.	<4. ± 0.2
Wagner, 25 KVA, Type HEK, Serial #5N67953	<4.	<4.	<4.	<4. ± 0.2
Wagner, 50 KVA, Spec. J1605P9351, Serial #5J46953	<4.	<4.	<4.	<4. ± 0.2
Wagner, 50 KVA, Spec. J1605E9351, Serial #5J46952	<4.	<4.	5.	5. ± 0.3
Wagner, 50 KVA, Spec. J1605E9351, Serial #5J46951	<4.	<4.	<4.	<4. ± 0.2
Central, 25 KVA, Spec. 1875-A, Serial #3446-6	<4.	<4.	<4.	<4. ± 0.2
Central, 25 KVA, Spec. 1875-A, Serial #3446-7	<4.	<4.	<4.	<4. ± 0.2
Central, 25 KVA, Spec. 1875-A, Serial #3446-9	<4.	<4.	<4.	<4. ± 0.2
Central 50 KVA, Spec. 1877-A, Serial #3544-14	<4.	<4.	<4.	<4. ± 0.2
Central 50 KVA, Spec. 1877-A, Serial #3544-4	<4.	<4.	<4.	<4. ± 0.2
Central 50 KVA, Spec. 1877-A, Serial #3544-15	<4.	<4.	<4.	<4. ± 0.2
Line Material, 10 KVA, C&T #411076-10J1, Serial #G52L9516	<4.	<4.	<4.	<4. ± 0.2
Line Material, 10 KVA, C&T #411076-10J1, Serial #G52L59517	<4.	<4.	<4.	<4. ± 0.2
Line Material, 10 KVA, C&T #E411076-10-H1, Serial #E5328202	<4.	<4.	<4.	<4. ± 0.2
Line Material, 10 KVA, C&T #TE511144-10, Serial #1371134	<4.	<4.	<4.	<4. ± 0.2
Line Material, 15 KVA, C&T #T-E511132-15, Serial #1558935	<4.	<4.	<4.	<4. ± 0.2
Line Material, 15 KVA, C&T #T-E511132-15, Serial #1558936	<4.	<4.	<4.	<4. ± 0.2
Line Material, 15 KVA, C&T #T-E511132-15, Serial #1558939	<4.	<4.	<4.	<4. ± 0.2
Line Material, 25 KVA, C&T #T-E511132-25, Serial #1513442	<4.	<4.	<4.	<4. ± 0.2

	Aroclor 1016, 1232, 1242 and/or 1248	Aroclor 1254	Aroclor 1260	Total Aroclors
Line Material, 25KVA, C&T #T-E511132-25, Serial #1507837	<4.	<4.	<4.	<4. ± 0.2
Line Material, 25KVA, C&T #T-E511132-25, Serial #1513444	<4.	<4.	<4.	<4. ± 0.2
Line Material, 25KVA, C&T #T-E511132-25, Serial #1316866	6.	10.	7.	23. ± 1.2
Line Material, 37 1/2 KVA, C&T #E411076-37-G11, Serial #EB133409	<4.	<4.	<4.	<4. ± 0.2
Kuhlman, 10 KVA, Type 0.1 S.C., Serial #B58829	<4.	<4.	16.	16. ± 0.8
Kuhlman, 10 KVA, Type 0.1 S.C., Serial #B58830	<4.	<4.	16.	16. ± 0.8
Kuhlman, 10 KVA, Type 0.1 S.C., Serial #B58834	<4.	<4.	16.	16. ± 0.8
Kuhlman, 10 KVA, Type 0.1 S.C., Serial #B58835	<4.	<4.	13.	13. ± 0.7
Kuhlman, 10 KVA, Type 0.1 S.C., Serial #B55255	<4.	<4.	<4.	<4. ± 0.2
Kuhlman, 15 KVA, Type 0.1 S.C., Serial #B58840	<4.	<4.	<4.	<4. ± 0.2
Kuhlman, 15 KVA, Type 0.1 S.C., Serial #B58841	<4.	<4.	<4.	<4. ± 0.2
Kuhlman, 25 KVA, Type 0.1 S.C., Serial #B55279	<4.	<4.	<4.	<4. ± 0.2
Kuhlman, 50 KVA, Type 0.1 S.C., Serial #B55401	<4.	5.	<4.	5. ± 0.3
Kuhlman, 50 KVA, Type 0.1 S.C., Serial #B55402	<4.	<4.	<4.	<4. ± 0.2
Kuhlman, 50 KVA, Type 0.1 S.C., Serial #B56130	<4.	<4.	<4.	<4. ± 0.2
Kuhlman, 50 KVA, Type 0.1 S.C., Serial #B56131	<4.	<4.	<4.	<4. ± 0.2

Sworn to and subscribed before me this 20th
day of October, 1983
My commission expires December 14, 1983

Notary Public

Title: Laboratory Manager

Approved By

Accredited by the American Association for Laboratory Accreditation in the chemical field of testing, as listed in the current AALA Directory of Accredited Laboratories

PCB SAMPLING DATA

SAMPLE No.	DATE Collected	LOCATION SAMPLED
GM 860004	16 June 1986	welding Shop Bldg. 256
GM 860005	16 June 1986	Sheet Metal Shop Bldg. 113
GM 860006	16 June 1986	Sheet Metal Shop Bldg 113
GM 860007	16 June 1986	Aerospace (Fuel Cell) Bldg. 111
GM 860008	16 June 1986	Ground Power (AGE) Bldg 126
GM 860009	16 June 1986	Ground Power (AGE) Bldg 126
GM 860010	16 June 1986	Ground Power (AGE) Bldg 126
GM 860011	16 June 1986	Engine Shop Bldg 126
GM 860012	16 June 1986	Corrosion Control Bldg 113
GM 860013	16 June 1986	Fire Dept. Bldg 121
GM 860014	16 June 1986	119th Ground Power Bldg 100
GM 860015	16 June 1986	119th Motor Pool Bldg 100
GM 860016	16 June 1986	228th AGE Shop Bldg 262
GM 860017	16 June 1986	Parachute Shop Bldg 103
GM 860018	16 June 1986	Vehicle Maint. Bldg 246
GM 860019	16 June 1986	Vehicle Maint.
GB 860020	2 July 1986	Sewage Treatment Plant (effluent)
GB 860021	2 July 1986	Flight Line Drainage
GB 860022	2 July 1986	Creek Exiting Base
PZ 860023	21 July 1986	Life Support Shop
BK 860024	21 July 1986	Life Support Shop
PZ 860025	14 August 1986	110/119th AGE Shop
BK 860026	14 August 1986	110/119th AGE Shop
PZ 860027	3 Sept. 1986	110/119th Comm. Maint.
PZ 860028	3 Sept. 1986	110/119th Comm. Maint.
PZ 860029	3 Sept. 1986	110/119 th Comm. Maint.
BK 860030	3 Sept. 1986	110/119th Comm Maint.

USAF OCCUPATIONAL & ENVIRONMENTAL HEALTH LABORATORY
ENVIRONMENTAL CHEMISTRY BRANCH (SAON)
BROOKS AFB, TX 78235-5501

LABORATORY REPORT

TO: 134th USAF Clinic
McGhee Tyson Airport
Knoxville, Tenn 37901-5000

DATE REPORTED: 28 AUG 1986
DATE RECEIVED: 8 JUL 1986

SAMPLE TYPE: TRANSFORMER OILS

ANALYSIS REQUESTED: POLYCHLORINATED BIPHENYLS (PCBs)

METHODOLOGY: Gas Chromatography (GC/EC)

OEHL NR.	BASE SAMPLE NR.	PPM	OEHL NR.	BASE SAMPLE NR.	PPM
45823.	GM860004	ND	45824.	GM860005	ND
45825.	GM860006	ND	45826.	GM860007	ND
45827.	GM860008	ND	45828.	GM860009	ND
45829.	GM860010	ND	45830.	GM860011	ND
45831.	GM860012	ND	45832.	GM860013	ND
45833.	GM860014	ND	45834.	GM860015	ND
45835.	GM860016	ND	45836.	GM860017	ND
45837.	GM860018	ND	45838.	GM860019	ND

ANALYSIS PERFORMED BY CONTRACT LABORATORY

ND--None detected. Less than the detection limit--5 PPM

TRACE--Present but less than the quantitative limit--10 PPM

LeRoy P. George

LeROY P. GEORGE, GS-12
Chief, Trace Organics Section

TO: 134th USAF Clinic
McGhee Tyson Airport
Knoxville, Tenn 37901-5000

USAF OCCUPATIONAL & ENVIRONMENTAL HEALTH LABORATORY
ENVIRONMENTAL CHEMISTRY BRANCH (SAON)
BROOKS AFB, TX 78235-5501

LABORATORY REPORT

TO: 134th USAF Clinic
Mc Ghee Tyson Airport
Knoxville, Tenn 37901-5000

DATE REPORTED: 28 AUG 1986
DATE RECEIVED: 8 JUL 1986

SAMPLE TYPE: TRANSFORMER OILS

ANALYSIS REQUESTED: POLYCHLORINATED BIPHENYLS (PCBs)

METHODOLOGY: Gas Chromatography (GC/EC)

OEHL NR.	BASE SAMPLE NR.	PPM	OEHL NR.	BASE SAMPLE NR.	PPM
45839.	GM860020	ND			

ANALYSIS PERFORMED BY CONTRACT LABORATORY

ND--None detected. Less than the detection limit--5 PPM

TRACE--Present but less than the quantitative limit--10 PPM

LeRoy George

LeROY P. GEORGE, GS-12
Chief, Trace Organics Section

TO: 134th USAF Clinic
Mc Ghee Tyson Airport
Knoxville, Tenn 37901-5000

APPENDIX G

Pest Management Program

APPENDIX G

McGhee-Tyson ANGB Pest Management Program

The McGhee-Tyson ANGB handles and utilizes certain pesticides, herbicides, and fertilizers. The Base is operating under a Pest Management Program which indicates the pesticide used, the location of use, and the manner of application. The application of pesticides is performed by both contract and in-house personel. All pesticides and herbicides are kept in CE Storage adjacent to building 320. For a listing of pesticides and manner of application please refer to pages G-2 thru G-12. It should be noted that any wastes resulting from pesticide/herbicide use are disposed of through an outside contractor.

(Use this space for mechanical imprint)

HAZARDOUS MATERIALS DATA

DATE (YYMMDD): 861031

WORKPLACE IDENTIFIER: 0332 CEEN 244F

BASE: McGhee Tyson Air Base

ORGANIZATION	WORKPLACE	BLDG NO/LOCATION	ROOM/AREA
134th CEF	Entomology	247	Basement

MATERIAL NOMENCLATURE (Manufacturer & Major Ingredients)	NATIONAL STOCK NUMBER (or NIOSH Number)	SPECIFICATION (MIL or FED)	MSDS ON FILE? (Y or N)	QUANTITY USED (per day, wk, mo, yr) PER YEAR	DISPOSAL METHOD (recycle, in process, etc.)	IEX CODE (8,9,none)	POTENTIAL HAZARD (Y or N) Inh	Abs	Ing	Con
CYANOGAS-A - Dust	6840-00-246-6436	MIL	4 LB	NONE	BURY (1)					
FINAL RAT BAIT	EPA 12455-15-AA	MIL	5 LB	5 LB	"					
INSECTICIDE - Aerosol	6840-01-067-6674	MIL		6-12% CANS	"					
MALATHION	6840-00-655-9222	MIL	5 GAL	NONE	"					
CHLORPHYRIFOS	6840-01-122-2651	MIL	7½ GAL	1½ GAL	"					
PYRETHRUM - Space Spray	6840-00-400-2140	MIL	8 GAL	4 GAL	"					
ROUND UP HERBICIDE	6840-01-018-9578	MIL	5 GAL	5 GAL	"					
PARAQUAT	EPA 239-2186-AA	MIL	2½ GAL	6½ GAL	"					
BOLT INSECTICIDE	14876	MIL	30-1/203	10-1/203	"					
FICAM INSECTICIDE	EPA 45639-MI-1	MIL	4 LB	NONE	"					
BAYGON	EPA 491-GA-1	MIL	2½ GAL	NONE	"					
HOSS GRANULAR WEED KILLER	EPA 10807-149-44802	MIL	50 LBS	50 LBS	"					

AF FORM JAN 82 2761

(1) disposal is done through a contractor which disposes of material

[redacted] a [redacted] rc [redacted] fi [redacted]

G-2

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION	COMMAND	DATE
	MCGHEE TYSON APRT KNOXVILLE, TN	ANG	1 AUG 87
	PERSON TO CONTACT/AUTOVON NO.		
	LT COL ARCHIE D BARNES, 588-8215		

REFER TO AFR 91-21 BEFORE COMPLETION

OBJECTIVE	1. a. Project No. b. Target Pest c. Purpose *(Specify)*	a. RMP (IV) b. German Roach c. Health and Morale
PESTICIDE	2. a. Active Ingredient(s) b. Trade Name c. Manufacturer d. EPA Registration No. e. Concentration	a. o, o-diethyl-o-(2-isopropyl-6methyl-4-pyrimidinyl) phosphorothioate, kerosene b. Octagon-Diazinon 520 c. CIBA-GEIGY Corp, U.S. Pat. #2,754,243 d. 904-211-6830 e. 1.25 fl. oz. per gallon water
APPLICATION	3. a. Form Applied *(dust, emulsion, gas, etc.)* b. Diluent	a. Emulsion b. Water
	4. a. Contract or In-house Application	a. In-house
	5. a. Method *(aerial, ground, manual, etc.)*	a. Manual (hand sprayed)
	6. a. Acres or Other Units to be Treated b. Number of Applications c. Number of Sites d. Specific Identity of Sites	a. 323,936 SF (see attached sheet) b. 12 per year c. 23 d. Bldg Nos. 101, 102, 110, 111, 113, 120, 123, 126, 134, 204, 205, 206, 209, 213, 221, 225, 226, 241, 246, 262, 263, 300, 320
	7. a. Month(s) of Year b. State	a. Every month b. Tennessee
SENSITIVE AREAS	8. a. Areas to be Avoided b. Areas to be Treated with Caution *(croplands, lakes, streams, food, human exposure, endangered species, etc.)*	a. Food processing b. Food storage
REMARKS	9. a. Precautions to be Taken b. State and Local Coordination c. Other	a. Use gloves and a respirator when mixing and when using in unventilated areas. b. N/A c. None

AF FORM JUL 79 646

Target Pest: German Roach (In-house)

	Building Number	Square Footage
1.	101 maint. control WPN SYS/M MOT.	7,356
2.	102 Base Squadron, Operations	28,169
3.	110 Avionics	3,996
4.	111 Upper Hangar	33,954
5.	113 Alert Hangar	35,908
6.	120 Fire Station	8,720
7.	123 Petrol Oper.	1,271
8.	126 AGE Shop	22,450
9.	134 134th Headquarters	19,500
10.	204 134th Dining Hall	14,534
11.	205 Barm.	16,327
12.	206 Barm.	16,327
13.	209 Base Gym.	7,315
14.	213 Base Theater	6,072
15.	221 Base Exchange	5,720
16.	225 134th Base Barracks-2	23,270
17.	226 Chapel	3,301
18.	241 Youth Service?	19,050
19.	246 134th VEH. Maintenance	4,746
20.	262 228th CCSQ Shop	7,160
21.	263 228th CCSQ HQ	10,976
22.	300 Clinic	8,014
23.	320 Base C.E.	19,800
	TOTAL	323,936 SF

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION: MCGHEE TYSON APRT, KNOXVILLE, TN	COMMAND: ANG	DATE: 1 AUG 87
	PERSON TO CONTACT/AUTOVON NO.: LT COL ARCHIE D BARNES, 588-8215		

REFER TO AFR 91-21 BEFORE COMPLETION

OBJECTIVE	1. a. Project No. b. Target Pest c. Purpose *(Specify)*	a. RMP (IV) b. German Roach c. Health and Morale
PESTICIDE	2. a. Active Ingredient(s) b. Trade Name c. Manufacturer d. EPA Registration No. e. Concentration	a. c,o-diethyl o-phosphorothioate, aromatic petroleum derivative solvent, inert ingredients b. Diazinon 4E c. Souther Mill Creek Products Co d. 6720-191 e. 1% finish spray
APPLICATION	3. a. Form Applied *(dust, emulsion, gas, etc.)* b. Diluent	a. Emulsion b. Water
	4. a. Contract or In-house Application	a. Contract
	5. a. Method *(aerial, ground, manual, etc.)*	a. Manual (hand sprayed)
	6. a. Acres or Other Units to be Treated b. Number of Applications c. Number of Sites d. Specific Identity of Sites	a. 85,216 SF (see attached sheet) b. 12 per year c. 5 d. Bldg Nos. 100, 102, 202, 223, 240
	7. a. Month(s) of Year b. State	a. Every month b. Tennessee
SENSITIVE AREAS	8. a. Areas to be Avoided b. Areas to be Treated with Caution *(croplands, lakes, streams, food, human exposure, endangered species, etc.)*	a. N/A b. Food processing, food storage
REMARKS	9. a. Precautions to be Taken b. State and Local Coordination c. Other	a. Wash after handling. Do not get in eyes, on skin or clothing. Do not breathe mist. May be fatal if swallowed. b. N/A c. None
	10. a. Cost	a. $780.00 for 1 year

AF FORM JUL 79 . 646

Target Pest: German Roach (Contract)

	Building No.	Square Footage
1.	100 (119th) Alert Quarters	30,413
2.	102 (119th) Base Squad. Oper.	5,720
3.	202 Security Hdq.	15,220
4.	223 Visit. Officer Quarters	3,162
5.	240 Base Supply	30,701
	TOTAL	85,216 SF

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION: MCGHEE TYSON APRT KNOXVILLE, TN	COMMAND: ANG	DATE: 1 AUG 87
	PERSON TO CONTACT/AUTOVON NO.: LT COL ARCHIE D BARNES, 588-8215		
	REFER TO AFR 91-21 BEFORE COMPLETION		

OBJECTIVE	1. a. Project No. b. Target Pest c. Purpose *(Specify)*	a. RMP (IV) b. Subterranean Termites c. Wood Protection
PESTICIDE	2. a. Active Ingredient(s) b. Trade Name c. Manufacturer d. EPA Registration No. e. Concentration	a. Chlordane and Heptachlor b. Termide c. Velsicol Chemical Co. d. 876-233AA e. 39.22% Chlordane, 19.60% Heptachlor
APPLICATION	3. a. Form Applied *(dust, emulsion, gas, etc.)* b. Diluent	a. Emulsion b. Water
	4. a. Contract or In-house Application	a. In-house
	5. a. Method *(aerial, ground, manual, etc.)*	a. Manual
	6. a. Acres or Other Units to be Treated b. Number of Applications c. Number of Sites d. Specific Identity of Sites	a. 32,771 SF (see attached sheet) b. Treated once, inspected annually and retreated only where necessary. c. 4 d. Bldg Nos. 100, 134, 209, 226
	7. a. Month(s) of Year b. State	a. Any month if necessary b. Tennessee
SENSITIVE AREAS	8. a. Areas to be Avoided b. Areas to be Treated with Caution *(croplands, lakes, streams, food, human exposure, endangered species, etc.)*	a. Inside the building b. Inside the building
REMARKS	9. a. Precautions to be Taken b. State and Local Coordination c. Other	a. Avoid well contamination. Treat foundations only. b. Conform to the Tennessee Department of Agriculture treating specifications. c. None

Target Pest: Subterranean Termites (In-house)

	Building No.	Square Footage
1.	100 (119th) Alert quarters	2,655
2.	134 134th Headquarters	19,500
3.	209 Base Gym	7,315
4.	226 chapel	3,301
	TOTAL	32,771 SF

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION: MCGHEE TYSON APRT KNOXVILLE, TN	COMMAND: ANG	DATE: 1 AUG 87
	PERSON TO CONTACT/AUTOVON NO.: LT COL ARCHIE D BARNES, 588-8215		

REFER TO AFR 91-21 BEFORE COMPLETION

OBJECTIVE	1. a. Project No. b. Target Pest c. Purpose *(Specify)*	a. RMP (IV) b. Subterranean Termites c. Wood Protection
PESTICIDE	2. a. Active Ingredient(s) b. Trade Name c. Manufacturer d. EPA Registration No. e. Concentration	a. Chlordane and Heptachlor b. Termide c. Velsicol Chemical Co. d. 876-22% Chlordane, 19.60% Heptachlor e. 39.22% Chlordane, 19.60% Heptachlor
APPLICATION	3. a. Form Applied *(dust, emulsion, gas, etc.)* b. Diluent	a. Emulsion b. Water
	4. a. Contract or In-house Application	a. Contract
	5. a. Method *(aerial, ground, manual, etc.)*	a. Manual
	6. a. Acres or Other Units to be Treated b. Number of Applications c. Number of Sites d. Specific Identity of Sites	a. 138,824 SF (see attached sheet) b. Treated once, inspected semi-annually and retreated only where necessary. c. 9 d. Bldg Nos. 111, 200, 202, 205, 206, 207, 208, 221, 225
	7. a. Month(s) of Year b. State	a. Any month if necessary b. Tennessee
SENSITIVE AREAS	8. a. Areas to be Avoided b. Areas to be Treated with Caution *(croplands, lakes, streams, food, human exposure, endangered species, etc.)*	a. Inside the building b. Inside the building
REMARKS	9. a. Precautions to be Taken b. State and Local Coordination c. Other	a. Avoid well contamination. Treat foundations only. b. Conform to the Tennessee Department of Agriculture treating specifications. c. None
	10 a. Cost	a. $396.00 for 1 year

Target Pest: Subterranean Termites (Contract)

	Building No.		Square Footage
1.	111	Upper Hangar	33,954
2.	200	PMEC Admin.	11,594
3.	202	Lecture Hall CC	15,220
4.	205	Dorm. VAQ	16,327
5.	206	Dorm. VAQ	16,327
6.	207	Armed Forces club, Open Mess	11,976
7.	208	Security Police	4,436
8.	221	Base Exchange	5,720
9.	225	134th Base Barracks	23,270
		TOTAL	138,824 SF

US AIR FORCE PEST MANAGEMENT PROGRAM REVIEW	INSTALLATION: MCGHEE TYSON APRT, KNOXVILLE, TN	COMMAND: ANG	DATE: 1 AUG 87
	PERSON TO CONTACT/AUTOVON NO.: LT COL ARCHIE D BARNES, 588-8215		

REFER TO AFR 91-21 BEFORE COMPLETION

OBJECTIVE	1. a. Project No. b. Target Pest c. Purpose *(Specify)*	a. RMP (IV) b. Rats and Mice c. Health and Morale
PESTICIDE	2. a. Active Ingredient(s) b. Trade Name c. Manufacturer d. EPA Registration No. e. Concentration	a. Wafarin, 3-(alpha-Acetonylbenzyl)-4-hydroxycoumarin N-(2-Quinoxalinyl) Sulfanjlamide (Sulfaquinoxaline), inert ingredients b. Final c. Bell Laboratories, Inc. d. 12455-15AA e. 100% pre-mixed
APPLICATION	3. a. Form Applied *(dust, emulsion, gas, etc.)* b. Diluent	a. Dry bait, pellet form b. Pre-mixed
	4. a. Contract or In-house Application	a. In-house
	5. a. Method *(Aerial, ground, manual, etc.)*	a. Manual
	6. a. Acres or Other Units to be Treated b. Number of Applications c. Number of Sites d. Specific Identity of Sites	a. 79,202 SF (see attached sheet) b. 12 per year c. 7 d. Bldg Nos. 120, 204, 221, 223, 225, 241, 246
	7. a. Month(s) of Year b. State	a. Every month b. Tennessee
SENSITIVE AREAS	8. a. Areas to be Avoided b. Areas to be Treated with Caution *(croplands, lakes, streams, food, human exposure, endangered species, etc.)*	a. Food processing b. Food storage
REMARKS	9. a. Precautions to be Taken b. State and Local Coordination c. Other	a. Use gloves when placing bait. Place bait in out-of-way areas away from food. b. N/A c. None

Target Pest: Rats and Mice (In-house)

	Building No.	Square Footage
1.	120 Fire Station	8,720
2.	204 Dining Hall	14,534
3.	221 Base Exchange	5,720
4.	223 Visit. officers' Quarters (VOQ)	3,162
5.	225 134th Base Barracks	23,270
6.	241 MOB Warehouse	19,050
7.	246 Vehicle maint	4,746
	TOTAL	79,202 SF

APPENDIX H

Storage Tanks

TABLE H.1

Underground Storage Tanks

Status	Date Installed	Capacity (gal)	Tank Construction *	Contents	Associated Building
Active	1952	50,000	Steel	JP-4	150(1)
Active	1952	50,000	Steel	JP-4	150(1)
Active	1952	15,000	Steel	JP-4	Apron Shoulder (Spot 7)
Active(2)	1952	1,000	Steel(2)	Off-Spec Jp-4	132(2)
Active	1956	3,000	Steel	Diesel	252
Active	1977	5,000	Steel	Diesel	262
Active	1970	6,000	Steel	Mogas	252
Active	1970	6,000	Steel	Mogas	252
Active	1956	3,000	Steel	Mogas (Unleaded)	252
Active	1977	5,000	Steel	Mogas	262
Active	1970	3,000	Steel	Mogas	100 (110/119th TCF)
Active	1970	3,000	Steel	Diesel	100 (110/119th TCF)

(1) This tank is located in the intermediate POL area.

(2) This tank is temporarily out of service, is located in the Main POL area, and is filled with water. It is the only underground tank known to be tar-coated.

* All underground steel tanks have cathodic protection.

TABLE H.2

Underground Heating Fuel and Oil/Water Separator Waste Oil Storage Tanks.

Status	Date Installed	Capacity (gal)	Tank Construction *	Contents**	Associated Building
Active	1952	20,000	Steel	Fuel Oil	132
Active	1952	5,000	Steel	Fuel Oil	130
Active	1977	15,000	Steel	Fuel Oil	204
Active	1977	10,000	Steel	Fuel Oil	101/111
Active	1977	3,000	Steel	Fuel Oil	262
Active	1975	3,000	Fiberglass	Fuel Oil	263
Active	1977	1,000	Steel	Fuel Oil	208
Active	1984	5,000	Steel	Fuel Oil	102
Active	1984	5,000	Steel	Fuel Oil	120
Active	1982	1,000	Fiberglass	Fuel Oil	134
Active	1986	1,000	Fiberglass	Fuel Oil	320
Active	1975	550	Steel	Waste Oil	126
Active	1975	300	Steel	Waste Oil	262
Active	1975	550	Steel	Waste Oil	254
Active	1975	550	Steel	Waste Oil	248/246
Active	1975	5,000	Steel	Waste Oil	111
Active	1975	550	Steel	Waste Oil	100 (110/119th TCF)
Active	1985	5,000	Steel	Waste Oil	132

TABLE H.3

Above Ground Storage Tanks

Status	Date Installed	Capacity (gal)	Tank Construction	Contents	Associated Building
Active	1952	91,500	Steel(1)	JP-4	128(1)
Active	1952	91,500	Steel(1)	JP-4	128(1)
Active	1952	210,000	Steel(1)	JP-4	128(1)
Active	1974	1,800(2)	Steel	JP-4	100 (110/119th TCF)
Active	1974	1,800(2)	Steel	JP-4	100 (110/119th TCF)

(1) Tank has cathodic protection and is located in the Main POL area.

(2) Tank is filled to a maximum inventory of 600 gallons.

NOTE: By 1987 each of the large above ground JP-4 tanks was modified so that the external floating roof was replaced with a fixed roof with the tank containing an internal floating type cover.